WEAVING

FOR BEGINNERS

WEAVING for beginners

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Foreword

This booklet has been designed for a twofold purpose, to be used in conjunction with the filmstrips in the Handcraft Series – "Weaving", and as an aid to the novice "on his own."

The illustrations are from the three filmstrips prepared by the National Film Board for the National Council on Fitness and the Department of National Health and Welfare, Ottawa:

1. Preparing the Warp.

2. Setting up the Loom.

3. General Information.

A short motion picture "Warp and Weft" produced by the National Film Board is also available.

Weaving can be a fascinating and highly useful hobby and it is sincerely hoped that the instructional material in this publication will be of real value to those learning to weave.

WEAVING FOR BEGINNERS

Man is a weaver by instinct and necessity.

No one knows when or where weaving first began, but we do know that it has come down to us through many centuries, retaining the purity of its first basic principle that of interweaving one set of threads across another set, held at a tension.

There are few of us who have not at sometime in our lives interwoven a few sticks, reeds, grasses or threads with other sticks or threads to form little mats or baskets. We did this unconsciously in our play as children and enjoyed the activity for its own sake as well as for the finished result.

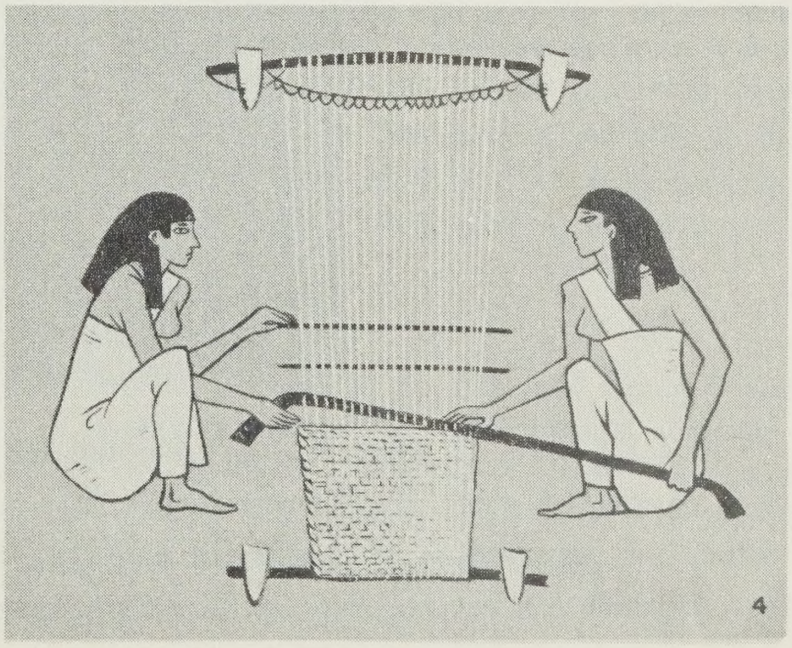
As we grew older most of us forgot these accomplishments, or sought a chance to develop this creative urge under proper guidance.

For this latter group, the film "Warp and Weft" and the accompanying filmstrips have been prepared.

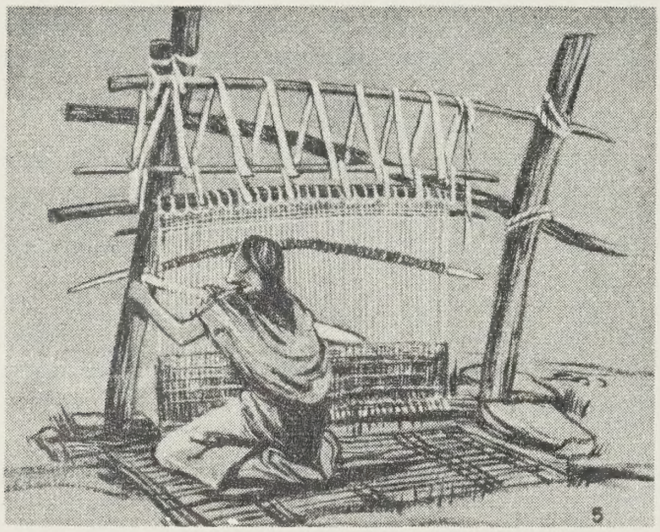
The information and instruction are basic. It touches only the fundamental principles – the A.B.C.'s of weaving. Once these have been mastered, the weaver can proceed on his own into an unlimited field of creative activity.

There are many types of looms, many types of weaving and unlimited opportunities to develop one's own style, designs and color harmonies.

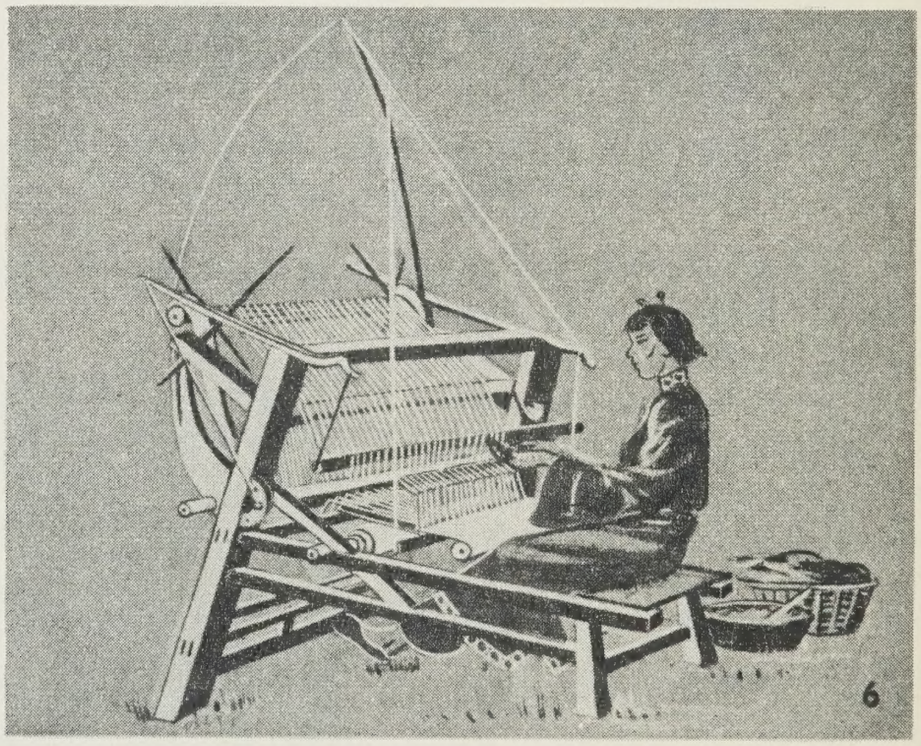
Here we see two weavers, one supplementing the work of the other as they weave on an old Egyptian loom. There are no treadles or other mechanical devices on this loom to separate the alternating groups of warp threads, so they are using a shed stick to help separate the threads before weaving in the weft threads with the fingers.



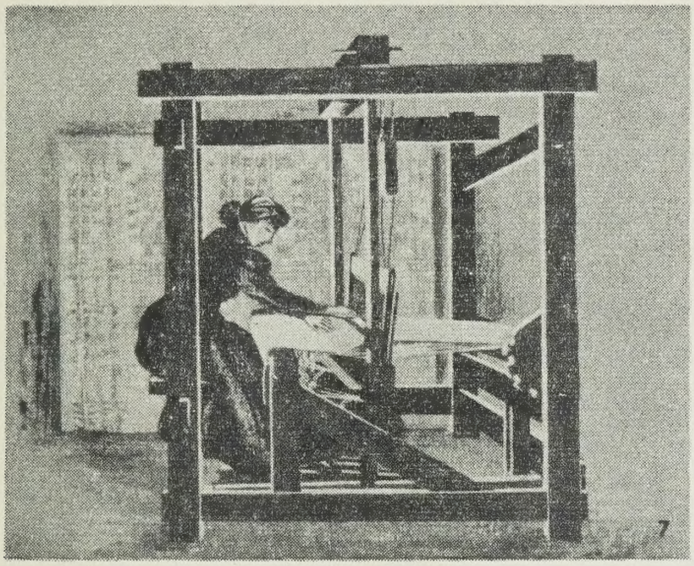
Weaving was accomplished in much the same way as we darn; weaving one set of threads called "the weft" over and under another set of tightly stretched threads called "the warp".



The Indians of the Southwestern United States; the Mexicans and the Guatamalian peoples in the new world; the Scandinavians, Poles, Slavs, Persians and many others in the Old World used almost identical techniques on almost identical looms and achieved almost identical results. Yet, through a study of primitive art forms, the historian can correctly place each in its own country. It is felt by many historians that these primitive techniques developed within the countries themselves rather than being taken from one country to another as traces of fabrics were found under circumstances which indicated that their manufacture predated the advent of intercommunication.



The Chinese, to whom we are indebted for the culture and development of the silkworm, were probably the first to introduce a mechanized method of separating the groups of threads. This made weaving much less tiresome and results were achieved much more quickly and easily.



Many of these old techniques have carried over to the present day and richly beautiful tapestries of vegetable-dyed, hand-spun yarns are being produced by experienced weavers.

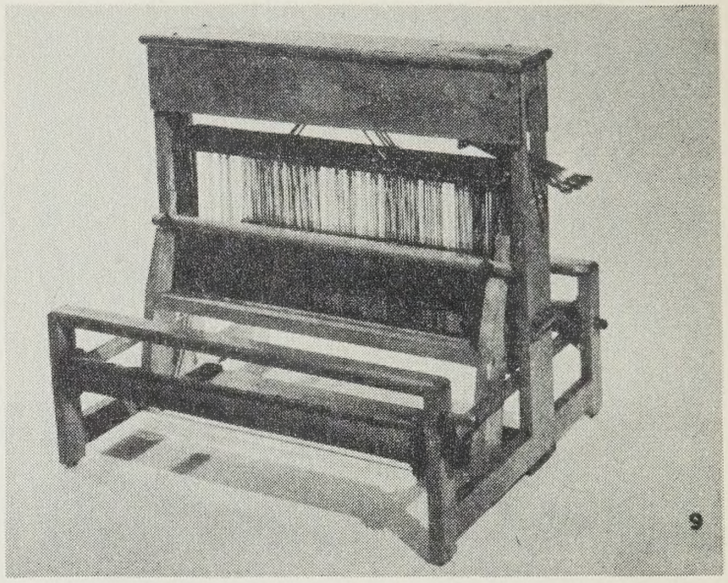
The technique is simple but the result depends upon creative imagination, artistic ability and an outstanding color sense.

The looms used by our grandmothers were large, rough cumbersome affairs. They were brought from Europe or made here.

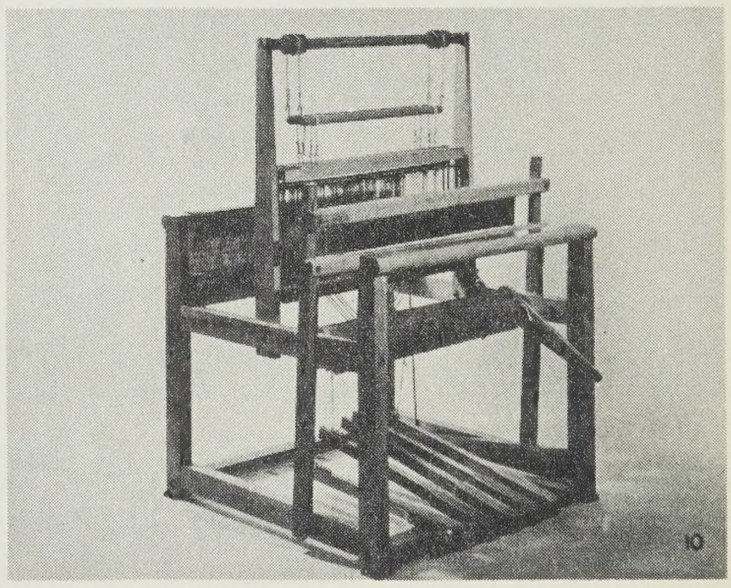
In the early days, looms were a necessity, as the settlers were dependent on the products of the loom for protection from the cold. They raised their own sheep, grew their own flax and spent interminable hours processing the wool and flax into threads to be woven on the loom. Blankets, clothing, floor coverings, rugs, wall and window draperies to keep out the cold, table covers, and blankets for the animals were all necessities.

The weaving was carried on by members of the family, by itinerant spinners and weavers or, in the wealthier families, by specially trained servants. On the old farms are still to be found the weaver's cottage, the dye house and various other buildings set aside for specific work. Some of the weaving that comes to us from this age is beautifully done; other samples show work that is crude and full of errors.

Modern looms are small, streamlined and easily moved about from place to place as the weaver desires.



The hobby weaver will find a table loom convenient and to his liking as it takes up little space, even though it operates with hand-levers which slows the progress somewhat. Considerable weaving can be accomplished in an evening or during a few spare moments.

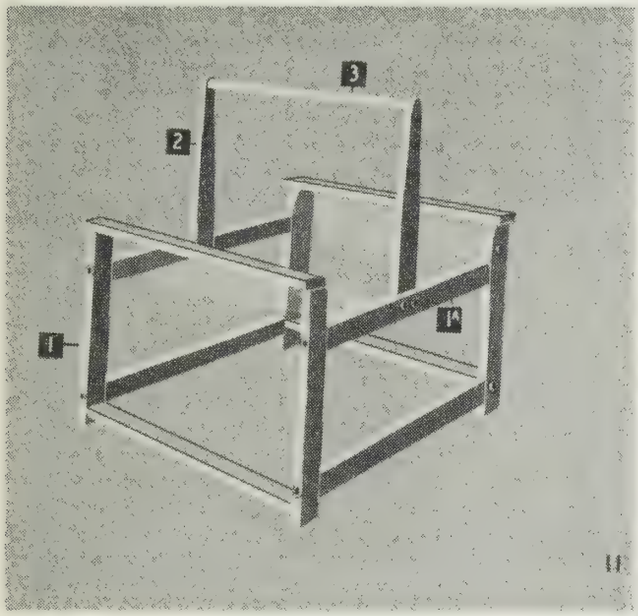


Floor loom harnesses are manipulated by foot treadles.

The newer types of floor looms are made to fold compactly and can be moved from room to room without being taken apart or without disturbing the threading.

The floor loom is a necessity for those who wish to weave yardages such as draperies, tweeds, blankets, car rugs, etc. This type of loom operates efficiently and once the principles of warping and threading are thoroughly understood, the work proceeds easily and rapidly.

Preparing the warp



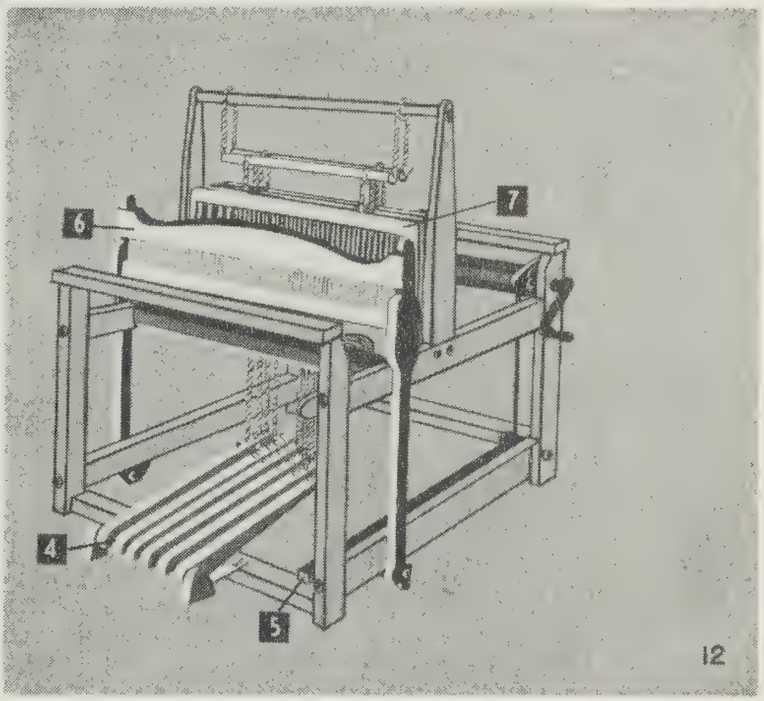
A loom consists of many parts and the weaver will do well to familiarize himself with the names when he first begins to weave.

The loom is composed of a frame of four sturdy posts (1) joined together at top and bottom with cross beams (1a). A roller (3) from which the harnesses are hung is supported between two upright side beams (2).

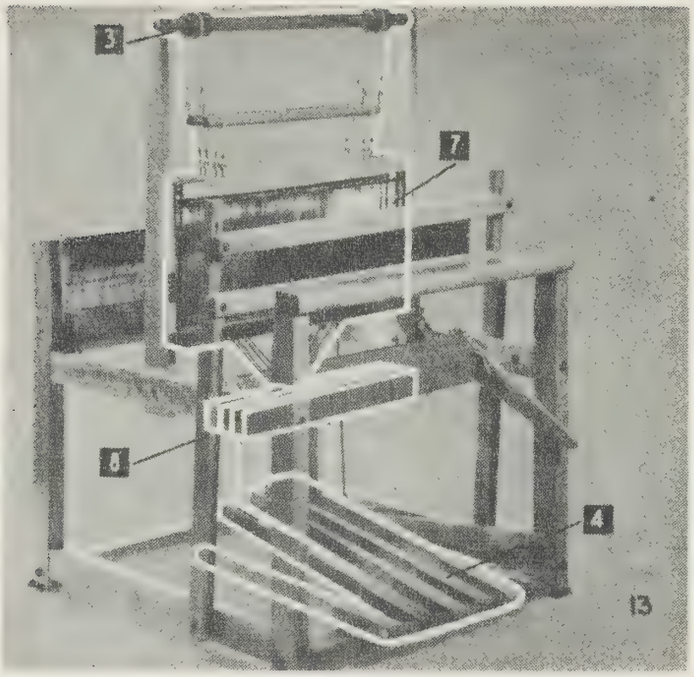
Below are the lamms and treadles (4) and the brake treadle (5). These have their own part to play in the operation of the loom.

The beater (6) holds the reed which in turn separates and holds the warp threads in position.

The beater, as its name implies, beats the weft threads back into place thus forming the web or cloth.



The treadles (4) when pressed down with the feet in alternating succession raise and lower the various sets of threads which have been threaded through the harnesses (7) according to a predetermined pattern or design. This threading can be simple or intricate according to the knowledge and ability of the weaver, the draft chosen and the article to be made.



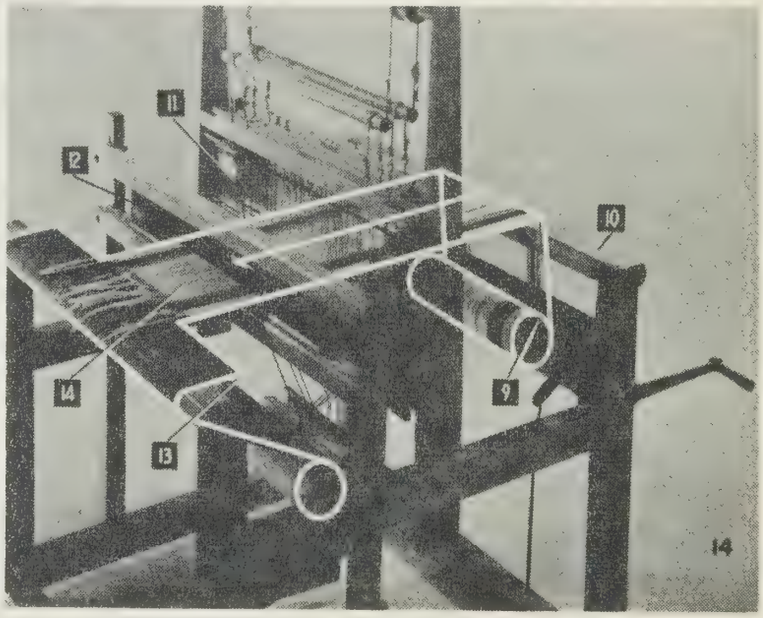
Other parts of the loom that contribute to the necessary operation are the lamms (8) and the treadles (4). These must all bear the correct relationship to one another.

The cords that pass around the rollers (3) and hold the harnesses (7) must all be the same length in order to obtain a good balance.

The cords that tie the bottom of the harnesses to the lamms must also be tied evenly so that there is a straight even draw down.

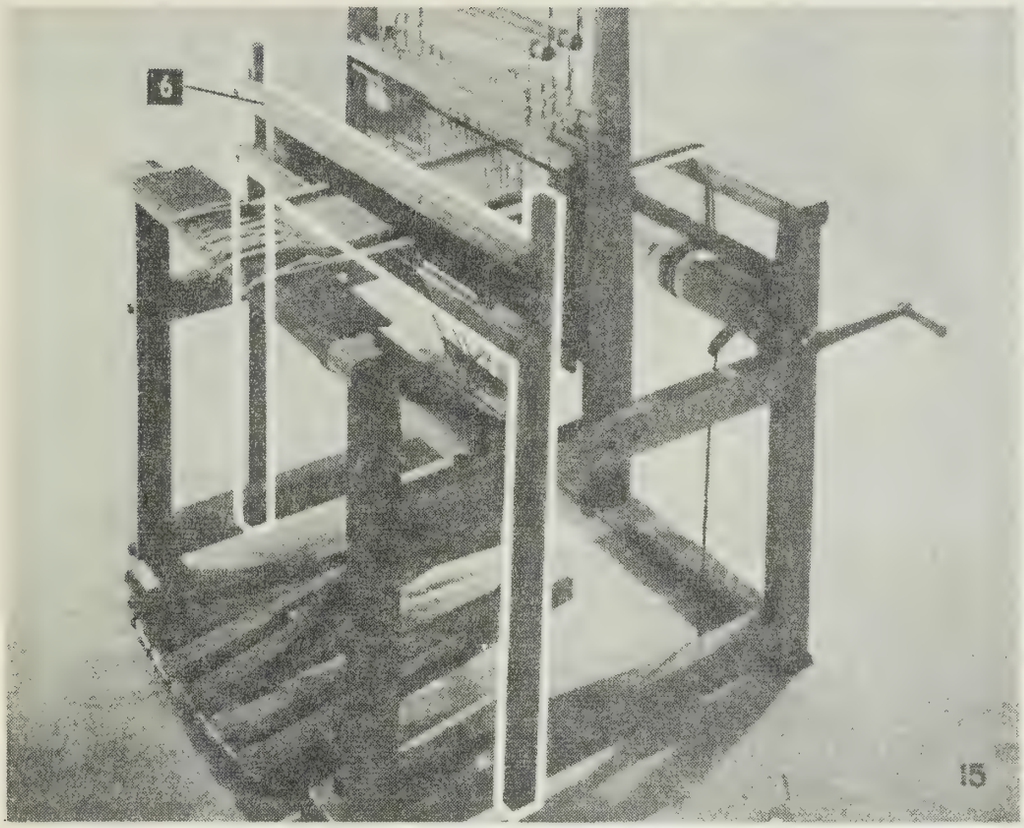
Another set of cords extends downward from the lamms to the treadles. These are tied to shorter cords permanently inserted through holes or in screweyes in the treadles. These two sets of cords are tied together with a snitch knot which is one of the weaver's trade marks.

Some of the newer looms have done away with these two sets of cords and now use one cord with snaps on both ends. Beginning weavers are frequently puzzled by the great number of screweyes on the lamms and treadles. As patterns become more complicated, more complicated tieups are needed in order to draw down the harnesses evenly. However, the beginning weaver does not need to be concerned with this problem at this time.

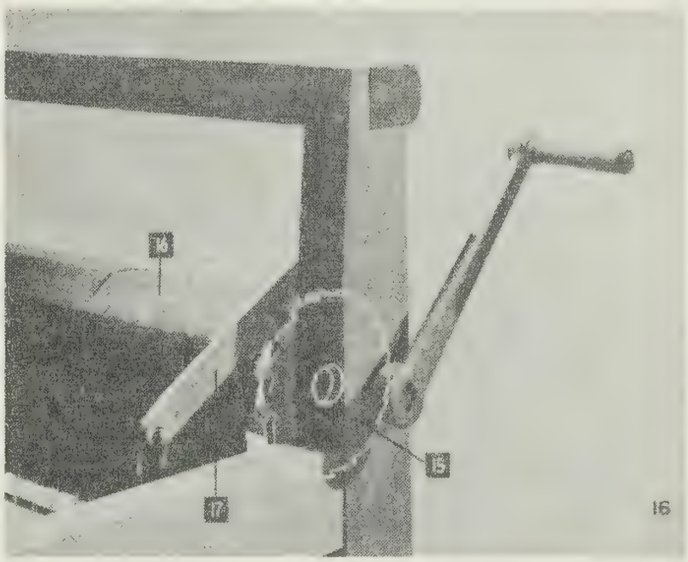


The warp threads (14) are tied to the warp beam apron rod (9) at the back of the loom, run up over the back beam (10), through the heddles (11) and the reed (12) and are tied to the cloth beam apron rod (13).

In order to weave successfully, each warp thread must be tied at the same tension. Good weaving cannot be achieved if the loom is out of line or the parts poorly balanced or if the threads are carelessly warped and threaded.

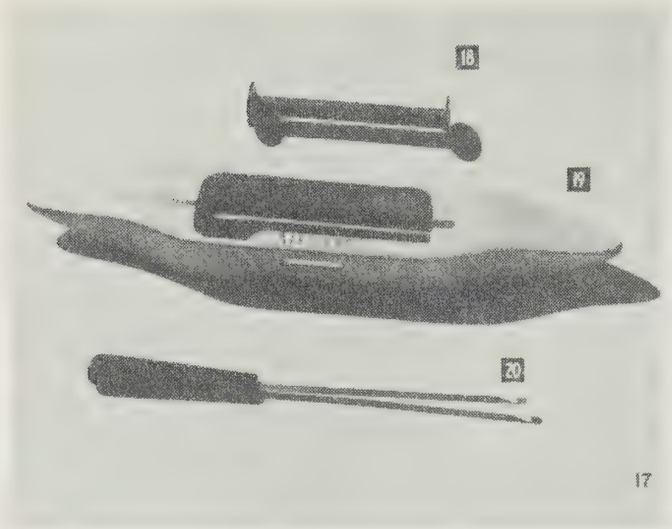


As explained in frame No. 15, the beater (6) has two distinct functions to perform, i.e., to keep the warp threads separated and in order, and to beat the weft threads back into position at the edge of the web.



Looms have two ratchet wheels (15), one near the warp beam at the back of the loom and the other near the cloth beam (16).

The ratchet wheels, when held in position by the dog or brake, (17) hold the warp, at a tension. When released, the warp can be wound toward the cloth beam. The handle turns the warp beam during the warping of the loom.



The weft thread is wound onto the bobbin (18) which, when filled, is placed on a rod in the boat shuttle (19).

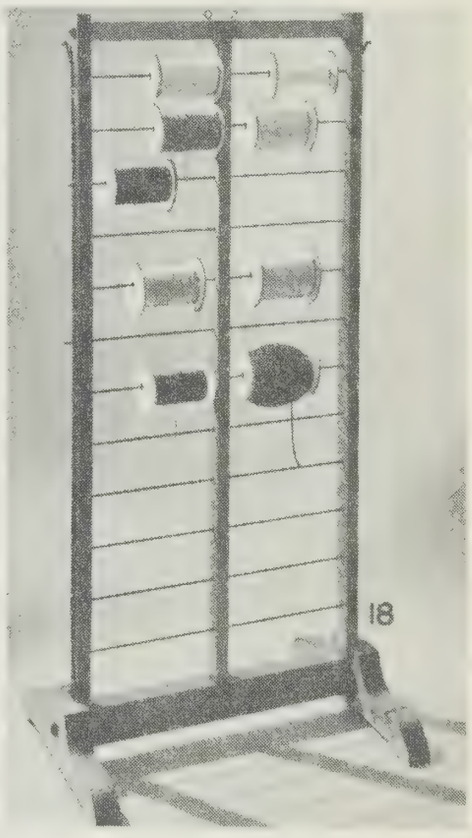
There are other types of shuttles – the flat or poke shuttle, the pickup shuttle and the large heavy shuttle to carry carpet rags or heavy rug wool.

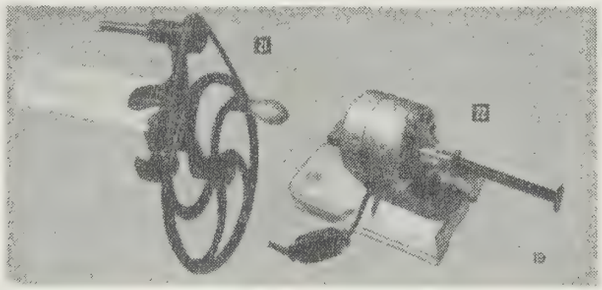
With the warp hook (20) the warp threads are pulled through the heddles (11) and through the reed (12). The warp hook has no other function and is laid aside once the threading is completed, except as required occasionally to assist in the mending of a broken thread.

A rack to hold the spools is a convenience rather than a necessity unless a sectional warp beam is being used.

The spools from which the warp is being wound could just as well be placed on large spikes driven through a heavy piece of plank placed on the floor. Or each spool could be placed in a pitcher or bowl of its own to prevent the threads becoming tangled during the winding.

However, if you have room and can afford a spool rack, by all means have one.



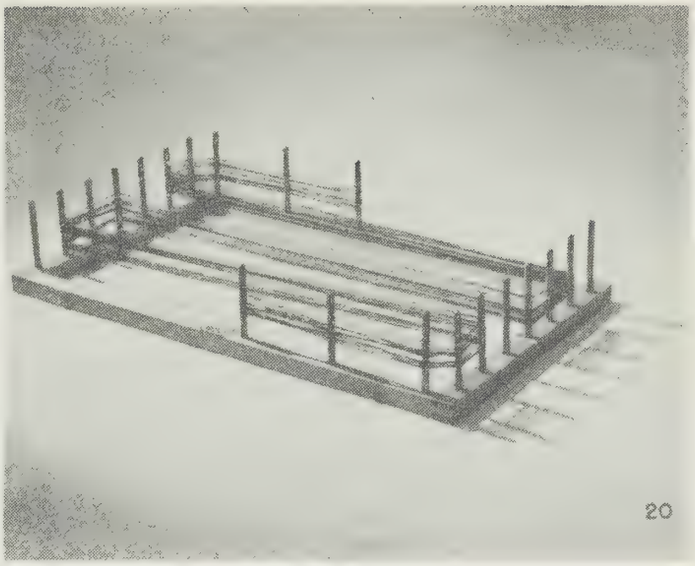


There are two types of bobbin winders – the hand winder (21) and the motorized winder (22).

Weavers with ingenuity can rig up bobbin winders on the sewing machine, the milk separator, the lathe or on any small motor to which a small shaft can be attached.

The hand winder serves the average weaver adequately, but for those interested in production a motorized winder cuts production time considerably.

Before the loom can be threaded it is necessary to prepare a warp of a given number of threads each one of the same length and the same tension. This is done on either a warping board or reel.


20

The weaver who is handy with tools can make his or her own warping board. Directions giving size, shape and general design can be found in the various weaving books. When making a warping board it is absolutely necessary to have the pegs of sturdy material and to sink them well into a heavy well braced frame. The tension of the threads as they pile up around the pegs will soon pull them out of line if they are not sturdy.

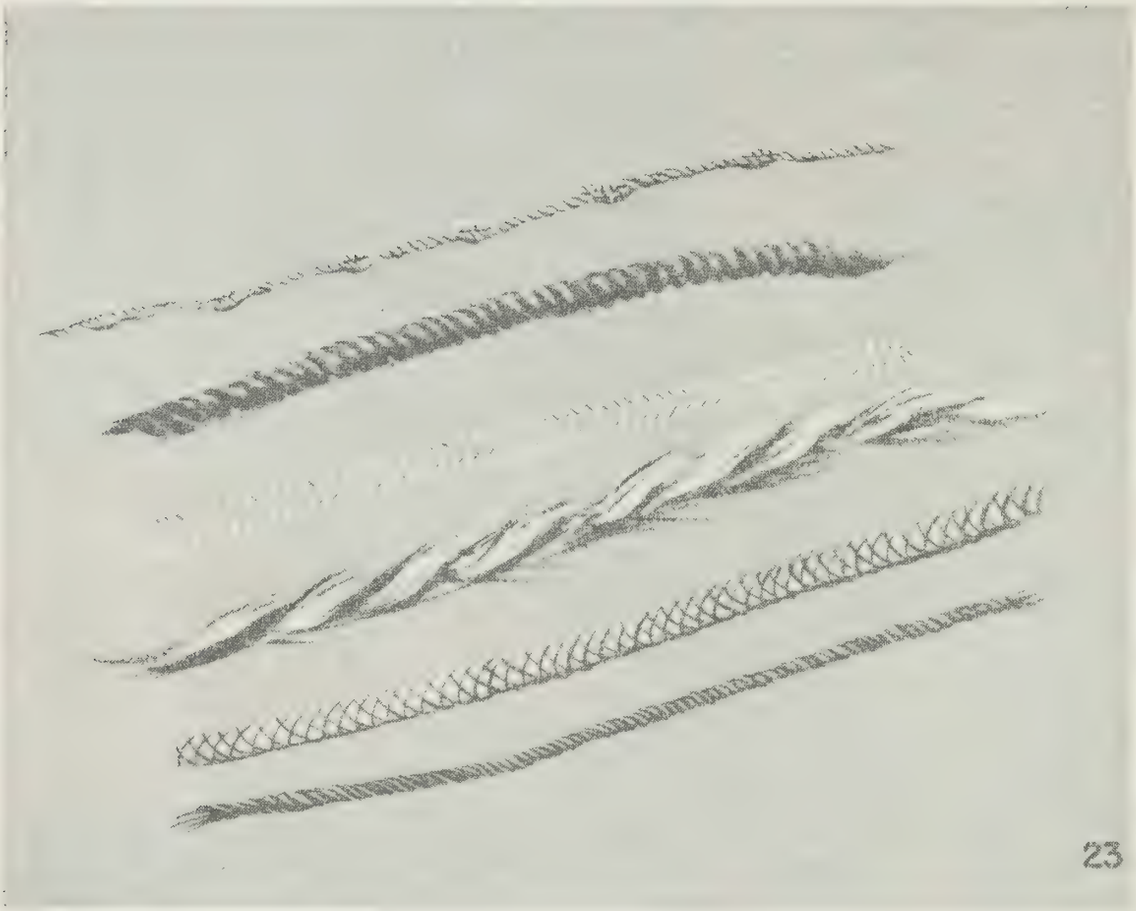
One ingenious weaver sunk pegs along both sides of a door frame with excellent results. She removed the pegs when the warp was wound and stored them in a small box thus solving a storage problem. Incidentally the space across the doorway from peg to peg was exactly one yard so she had no problem with measurements.


21

On the warping reel, warps of any desired length or number of threads can be wound as many as 1000 fine threads 20 or 30 yards long, or a short warp of 100 or less threads can be wound on the same reel.

For shorter lengths it is necessary to slide the bars holding the turning pegs up the reel close to the top.

Selecting material and pattern

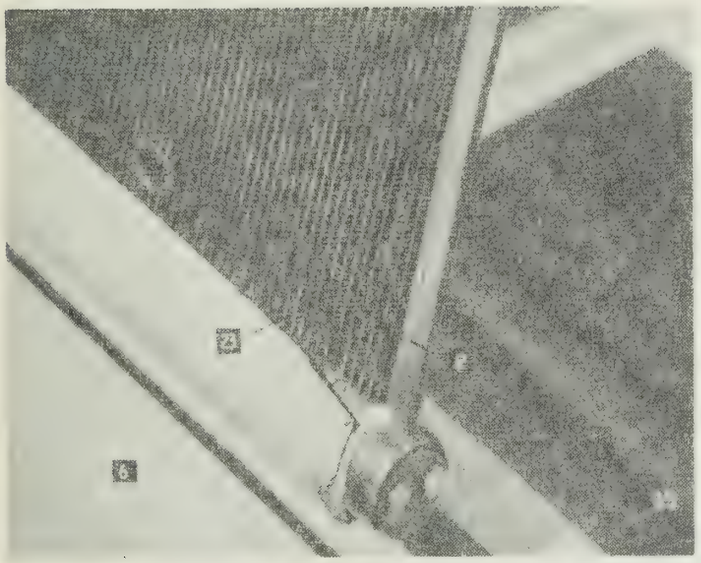


Cotton, wool and linen are the types of threads most commonly used for hand weaving although within the past few years many synthetic threads – the rayons, nylons and metallics – have become popular with weavers.

The materials chosen must be in keeping with the article to be woven. The size, texture and color must all be given consideration, then the threads must be correctly sleyed in the reed and the weaving carefully beaten to obtain the desired result.

Beginning weavers should concentrate first on the heavier cottons, then on the finer cottons and heavy wools, progressing slowly to the linens, fine wools and synthetic fibres.

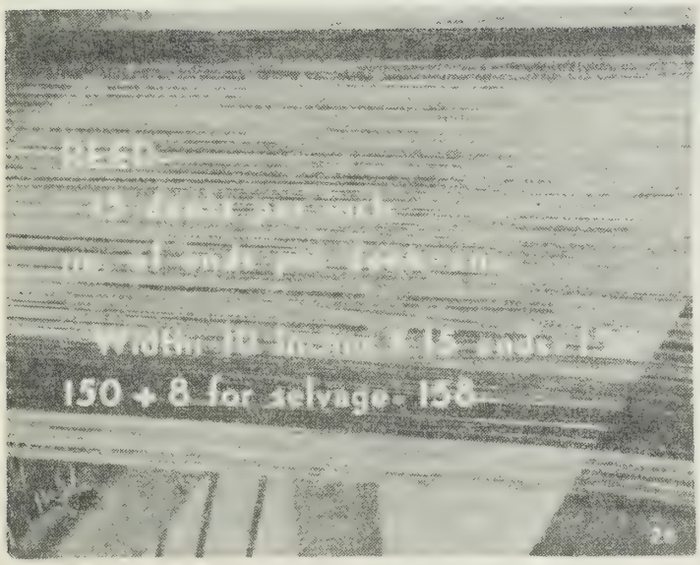
First projects should be narrow. Not until the weaver can successfully handle the shorter narrow warps should wide widths be attempted. It is essential, too, that the weaver thoroughly understand the manipulation of the loom, its capabilities and limitations before experimenting with difficult threads.



The reed (12) rests in the beater (6).

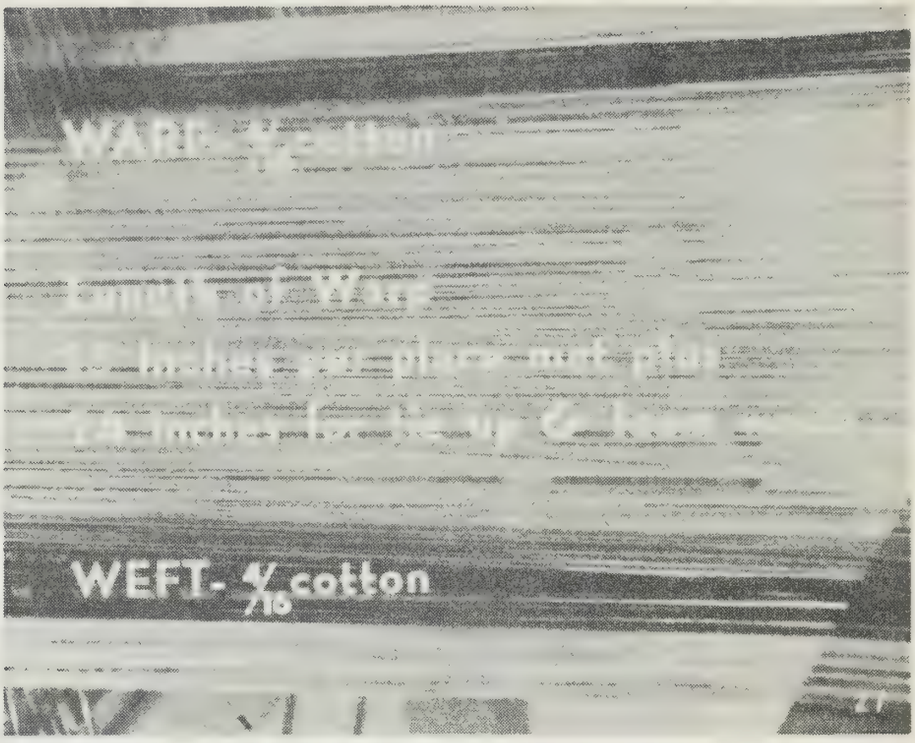
The number of dents (23) or spaces to the inch determines its suitability for the various threads. A fifteen dent reed is the best size for beginners and is in fact a most useful size for any weaver to own.

Some of the weaving books list the various sizes of reeds together with suitable sizes of threads, and suggest articles to be woven using the different combinations.



If the following directions are closely followed there should be no difficulty in figuring the amount of warp needed.

For the first sample: the reed to be used has 15 dents to the inch; the number of warp ends threaded per dent is one; the width of the sample to be woven is 10 inches. Therefore, to determine the number of threads required, multiply 10 x 15 which equals 150 threads. In addition it is well to allow a few extra threads for "drawn" and for shrinkage, in this case 8 extra, making a total of 158 threads to be warped.



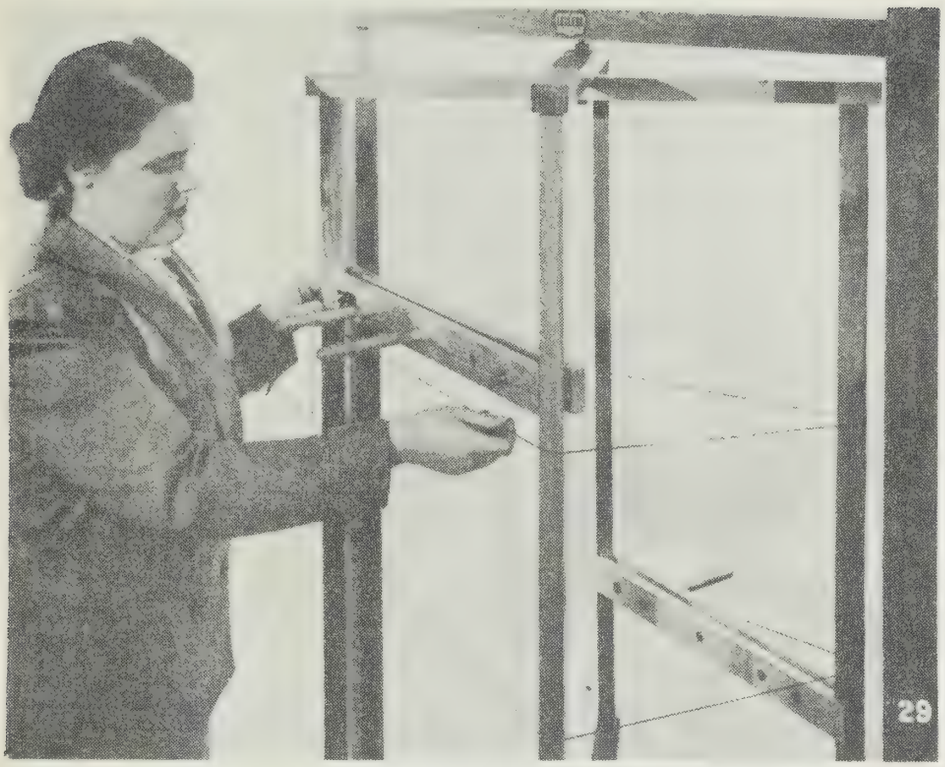
To determine the amount of material needed, multiply the number of threads required (see frame 26) by the total length of the material to be woven. This will give a figure usually in the thousands. When buying materials look on the label or on the inside of the cone or tube for the number of yards per pound. Reputable dealers in cottons, wools, linens and synthetic threads always furnish at least the approximate yardage per pound.

In calculating the amount needed for a specific article (and as an example let us decide on a 15" x 10" place mat) *for each mat* allow 16" (plus whatever is required for fringe or hem) multiply the total number of inches decided upon by the number of mats to be woven. Once this figure has been determined, add 1 extra yard to cover loom waste, tie-up knots and a bit for experimenting with samples and for shrinkage. It is difficult to calculate the actual shrinkage for any given article. The tension at which it is woven, the pattern used, the weaver's ability and the method of washing are all contributing factors.

Weft thread requirements run somewhat less than the warp requirements in a fifty-fifty type of weave.

It is more difficult to determine the exact amount of weft thread needed because of several variants, for instance beating, A closely beaten fabric requires more than a loosely beaten piece. Theoretically one can come quite close by figuring the number of threads per inch required to give the desired texture. For instance, if this is 15 then multiply the 15 by the width of the material. Now multiply this figure by the yardage to be woven.

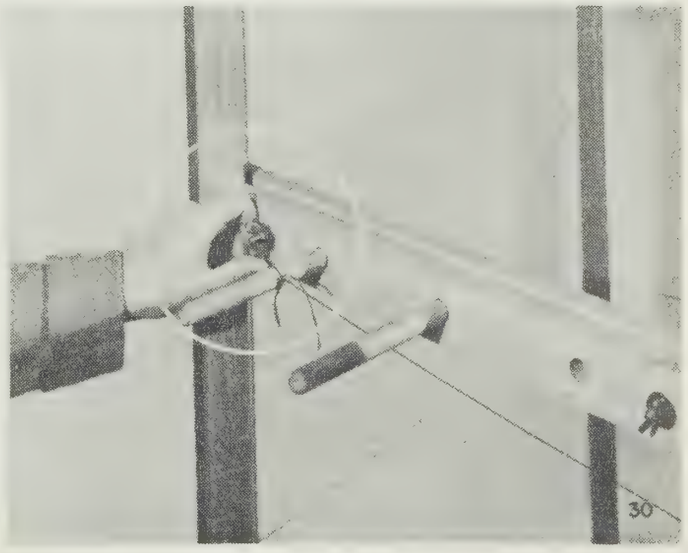
Winding the warp



As explained in frame 20 it is necessary to have some method whereby a given number of threads can be wound the same length and at the same tension.

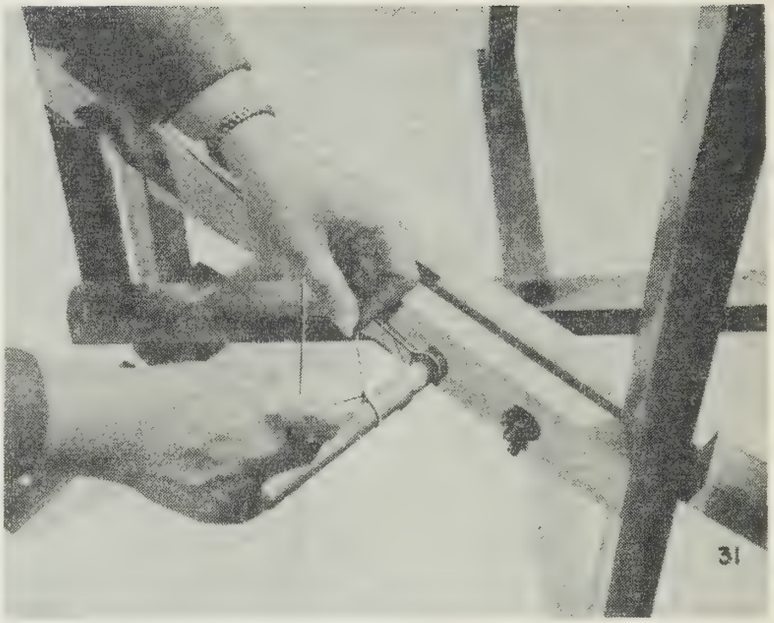
The frames that follow show how this is done.

After the length required for the warp has been determined a guide string of this length is cut. This string should be of a material and texture different from the warp so it can easily be seen and followed. The string is attached to the first peg and carefully wound around the reel to the bottom or turning peg. This may require only a few turns of the reel, or may require many, depending upon the length of the warp. If a short warp is being wound, it will be necessary to adjust the bar that holds the pegs around which the warp turns.



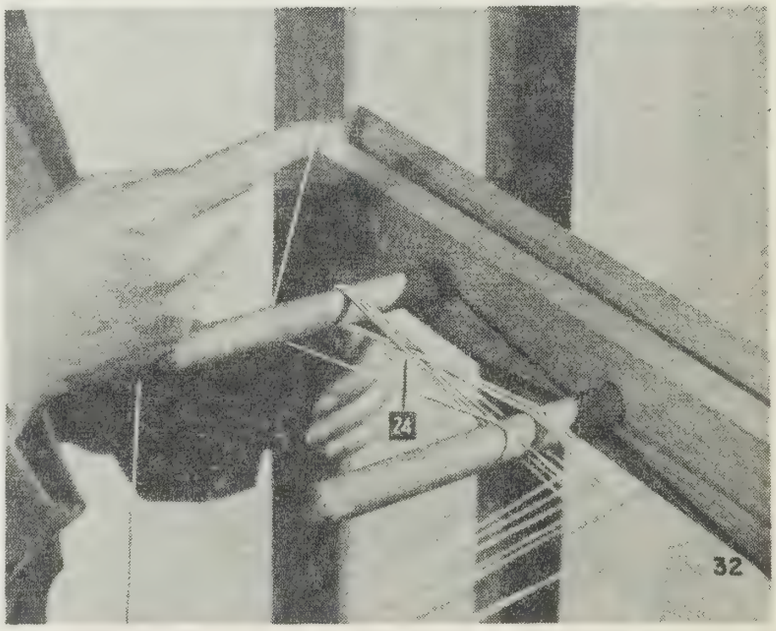
Once the guide string is in position on the reel the actual winding of the warp can begin.

The spools, tubes or balls from which the warp is to be wound are placed in position either on a spool rack, on a frame with spikes on the floor, or in pitchers or bowls.



It is a time saver to wind two or three threads simultaneously. More than three are apt to tangle. Two is a satisfactory number and cuts the warping time in half.

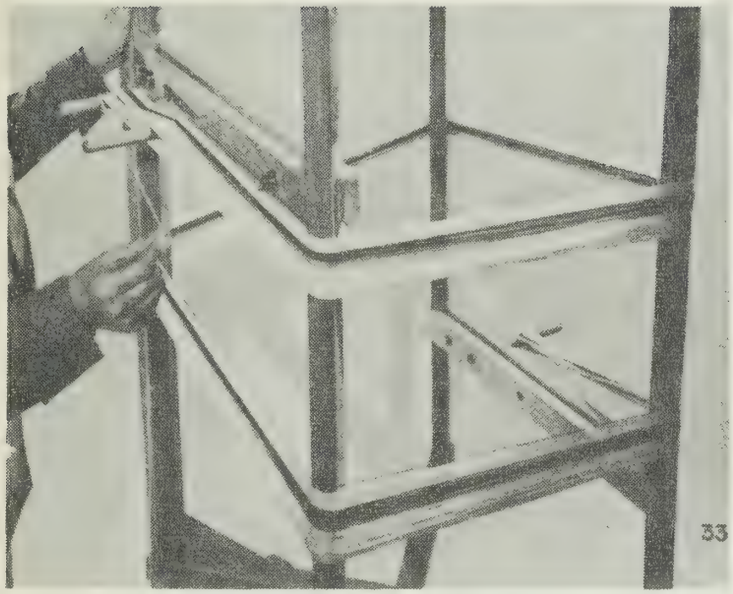
The two ends are tied to the first peg and wound around the reel, carefully following the guide string.



The reel is turned with the left hand and the warp guided with the right.

As the threads return to the top pegs they are carefully guided through the space between the two pegs so that they alternate. In passing down the reel, the threads lie on top of the first peg and under the second. On the return trip, the threads are reversed and lie on top of the second peg and pass under the first peg.

This crossing of the threads between the two pegs is known as the "cross" (24), "leash" or "porrey cross", a term seldom used by modern weavers but still found in books. This cross is most important as it is here that the leash or shed sticks are inserted. The crossing of the threads at this point keeps them in their proper order and prevents a tangled warp.



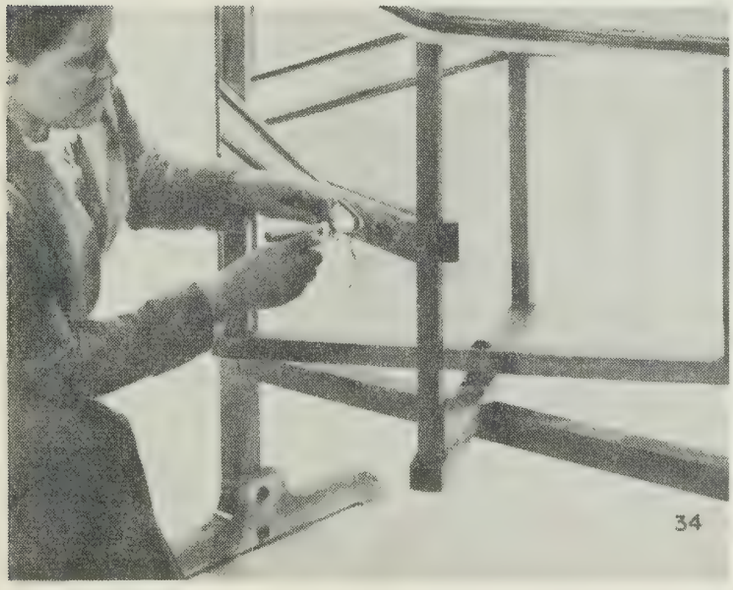
33

Note how evenly and smoothly the threads lie on the warping reel.

In passing the threads down the reel to the turning peg keep them on the bottom side of the guide string; on the return up the reel, keep them on the top of the guide string.

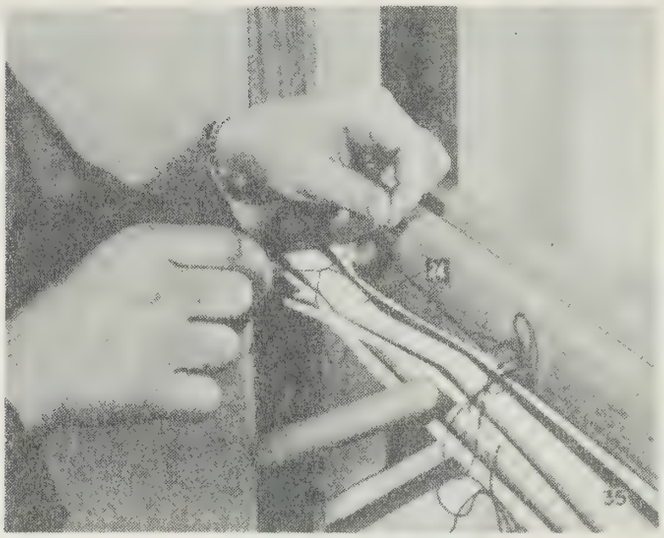
It is customary to count the threads at the cross, though some weavers prefer to do it elsewhere as it is somewhat easier to get at the threads.

If warps with many threads are being wound, it is well to tie a contrasting colored heavy thread around each one hundred as they are counted off. This saves time which would otherwise be required to recount the entire warp.

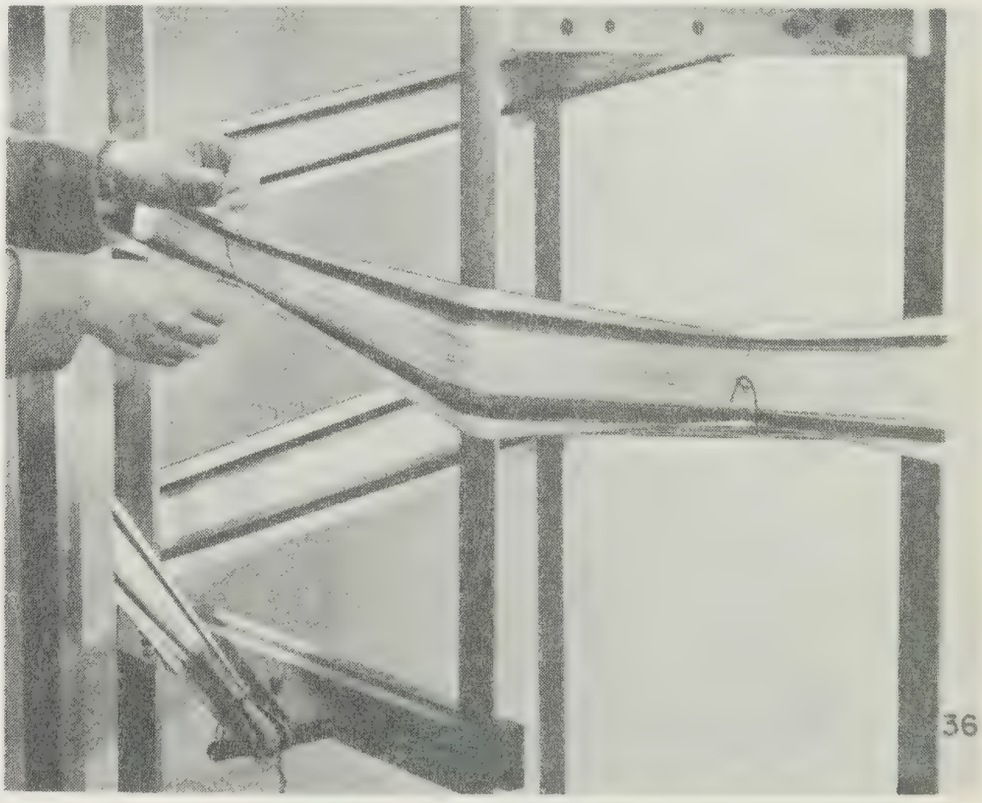


34

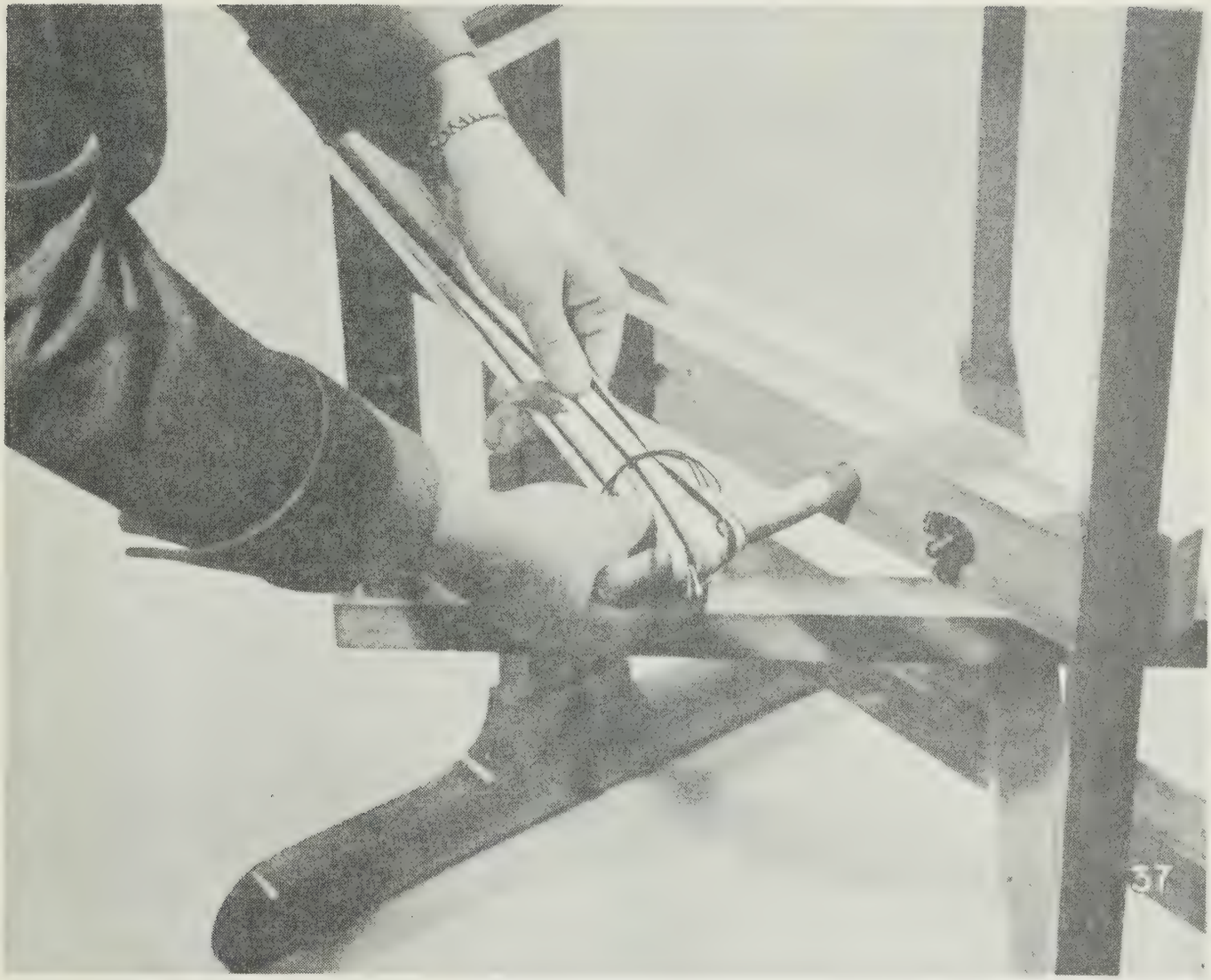
Once the required number of threads has been wound, tie a sturdy colored thread around the warp where it lies close to the turning peg.



Next tie a thread of heavy contrasting color around the leash, or cross (24), made by the crossing of the threads between the two top pegs. Be sure the cord is inserted in the right place, passing around the two sets of warp threads.



To prevent the warp tangling, tie pieces of cord tightly around warp at intervals of 24 or 36 inches.

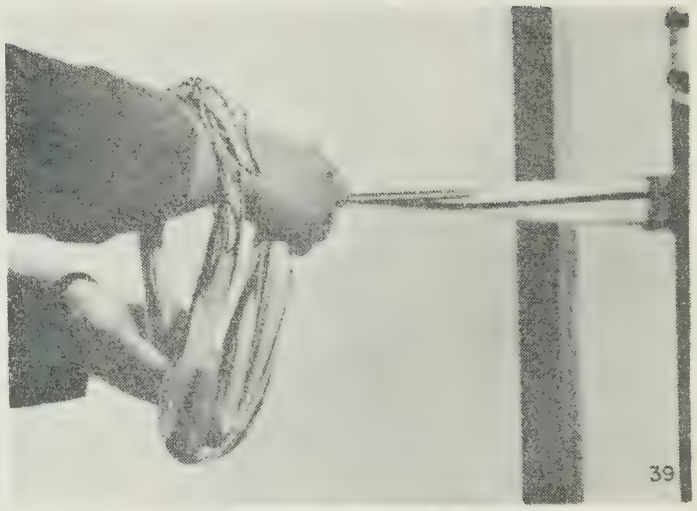


It is now time to make the warp chain.

If you know how to crochet, the process will be easy for you as your hand and arm take the place of your crochet hook. However, if you do not crochet, carefully watch the next eight frames as the various steps are shown.

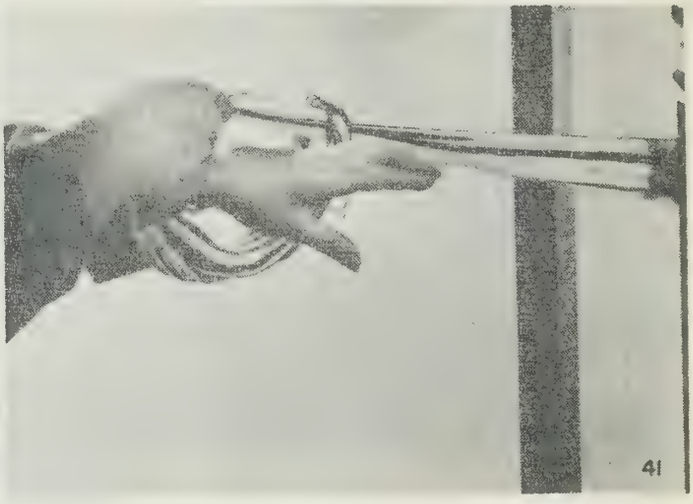
Making the warp chain

Step one

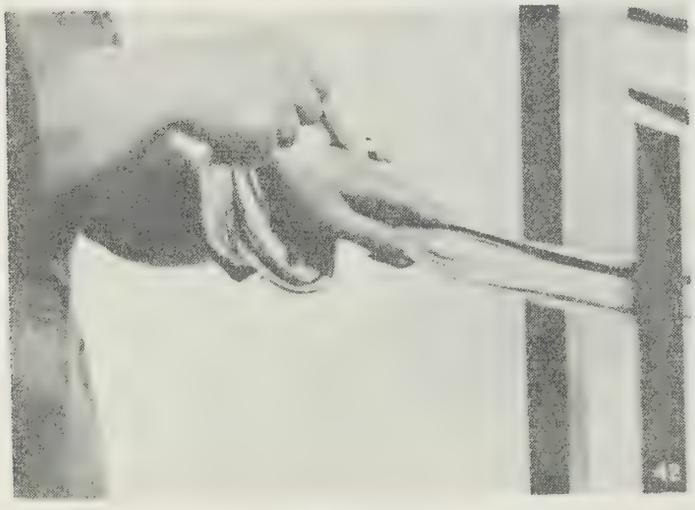


Step two

Step three



Step four



Step five

Step six


44

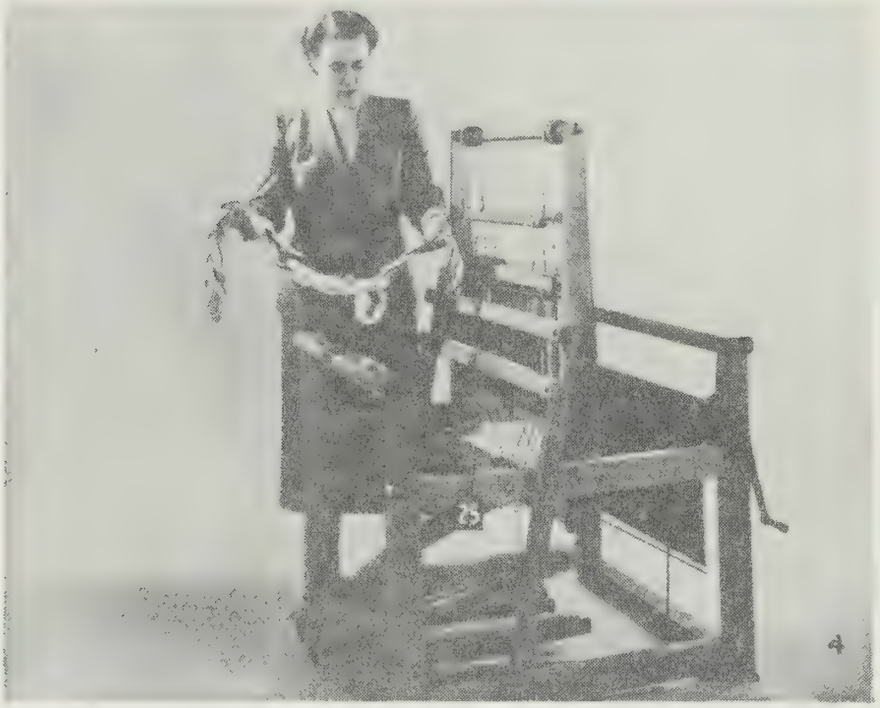
Notice how the weaver at this point uses her foot to prevent the reel turning more swiftly than she can make her chain. If she did not use a break of some sort the reel would gain momentum and the warp would fall off and become badly tangled.


45

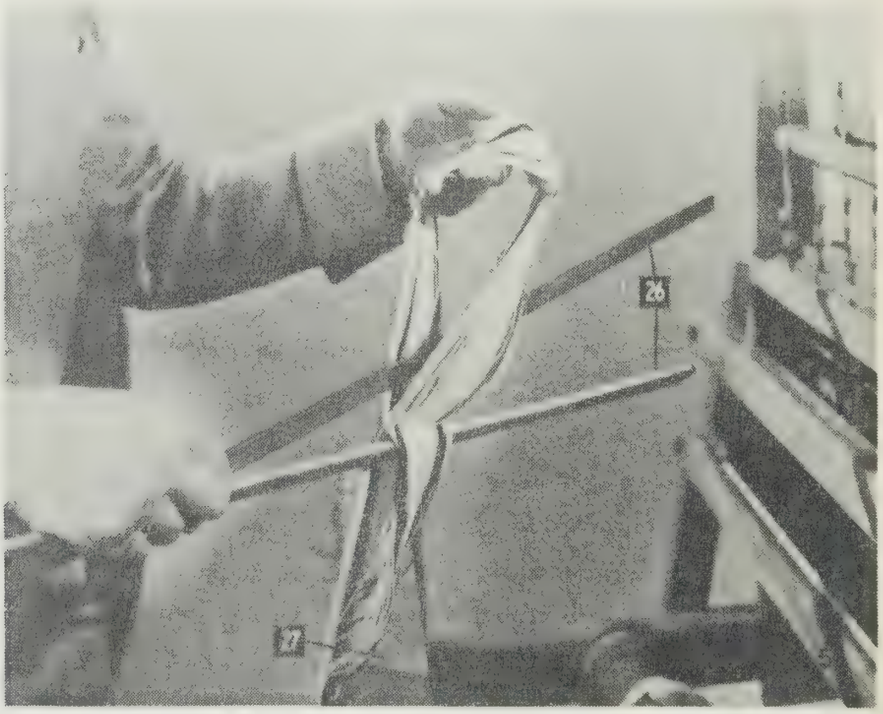
The warp has now been chained close to the pegs and is carefully held to prevent its falling to the floor. If the chain is very long, it is thrown over the weaver's shoulder.

If the chain is not going to be placed immediately on the loom, a stout cord is passed through the last loop and around the end of the chain and tightly tied. This prevents the chain unravelling and becoming tangled.

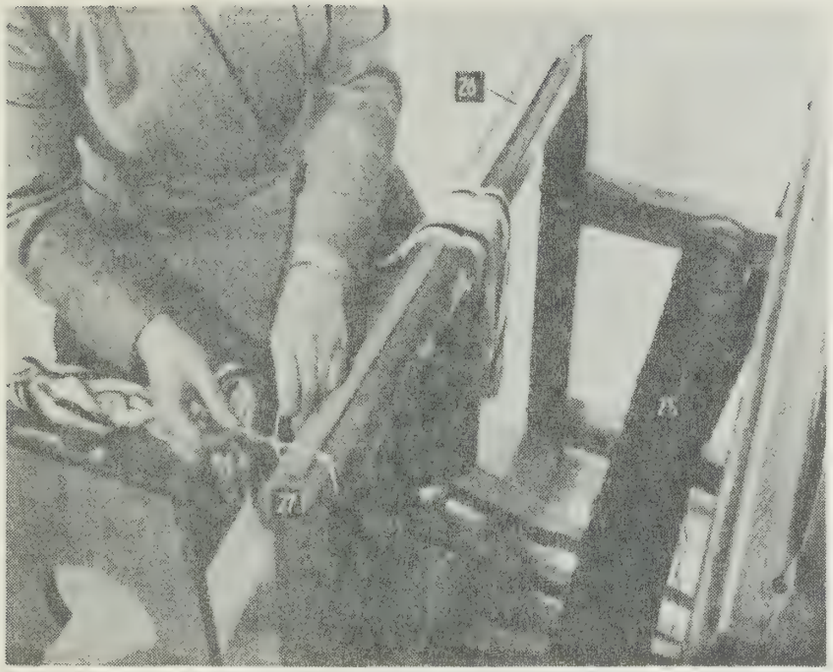
Setting up the loom



The warp chain is now brought to the loom preparatory to warping the beam (25).



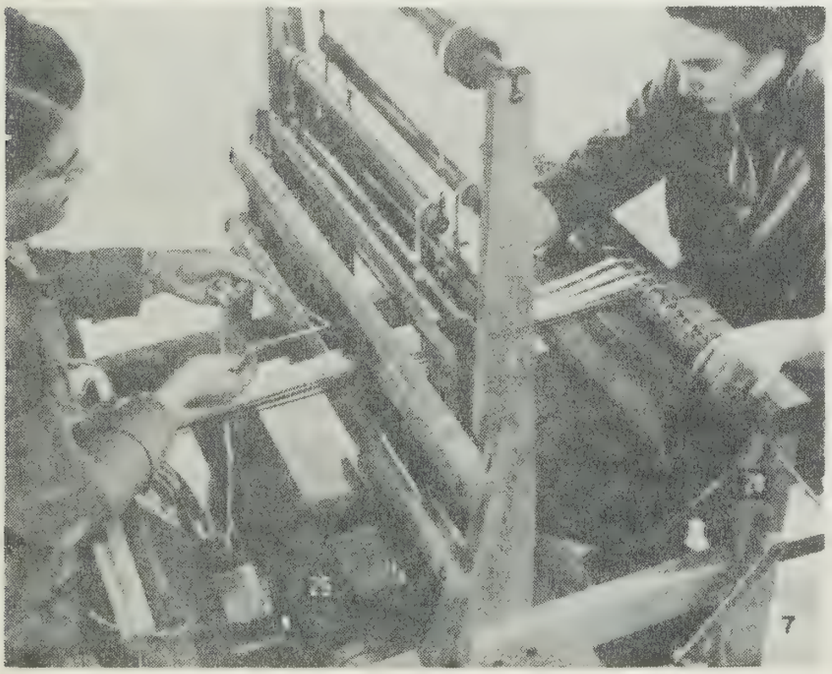
The leash shed sticks (26) are now inserted at each side of the cross that was made on the warping reel, and tied with the stout cord.



The leash or shed sticks (26) are now fastened securely to the breast beam (27), the cord that secured the leash is now removed and the warp carefully spread out toward each end of the beam.

Starting at the right, groups of threads of eight each are pulled through a single dent (23) in the reed with the warp hook and carefully drawn to the back of the loom. Tighten all threads so that there is an equal tension on them.

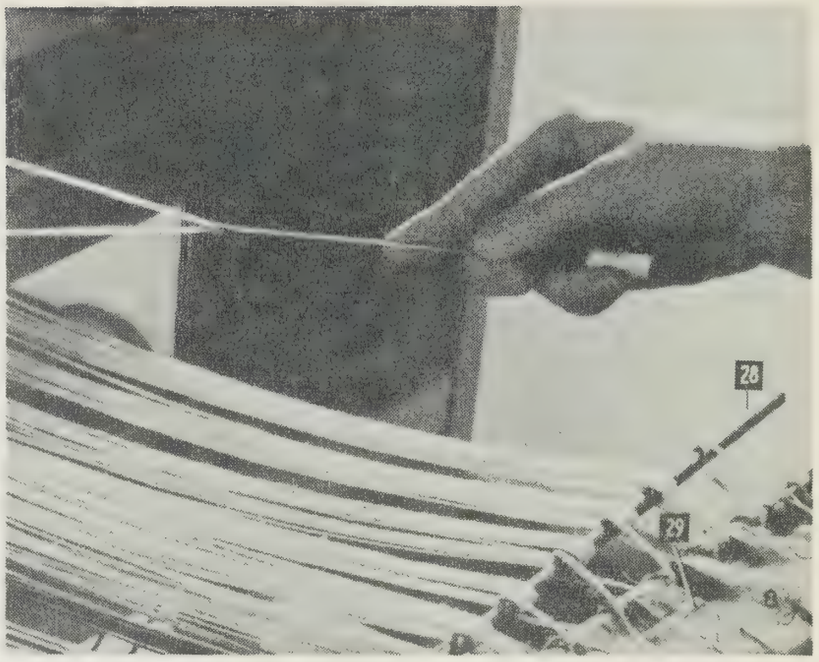
Eight dents are now skipped to the left of the dent through which the eight threads were drawn and a second group of eight threads is drawn through. These lie parallel with the first group. This process of sleying eight threads to a dent and skipping eight dents continues until all the warp ends have been drawn through the reed.



Here the assistant inserts the warp hook through the reed to catch the looped warp ends and draw them toward the warp beam (25).

As the groups of threads are drawn back the warp beam rod (28) is slipped through the looped ends.

Every craft has its own vocabulary and it is well to become familiar with these words as soon as possible, and to use them to save confusion.

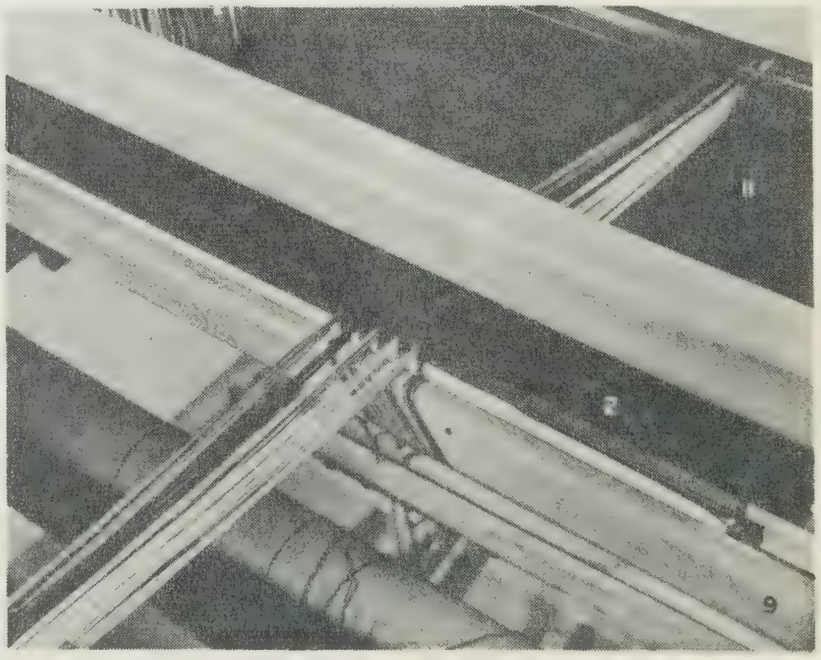


This frame, taken from a different angle, shows the method of pulling the groups of threads through to the back of the loom.

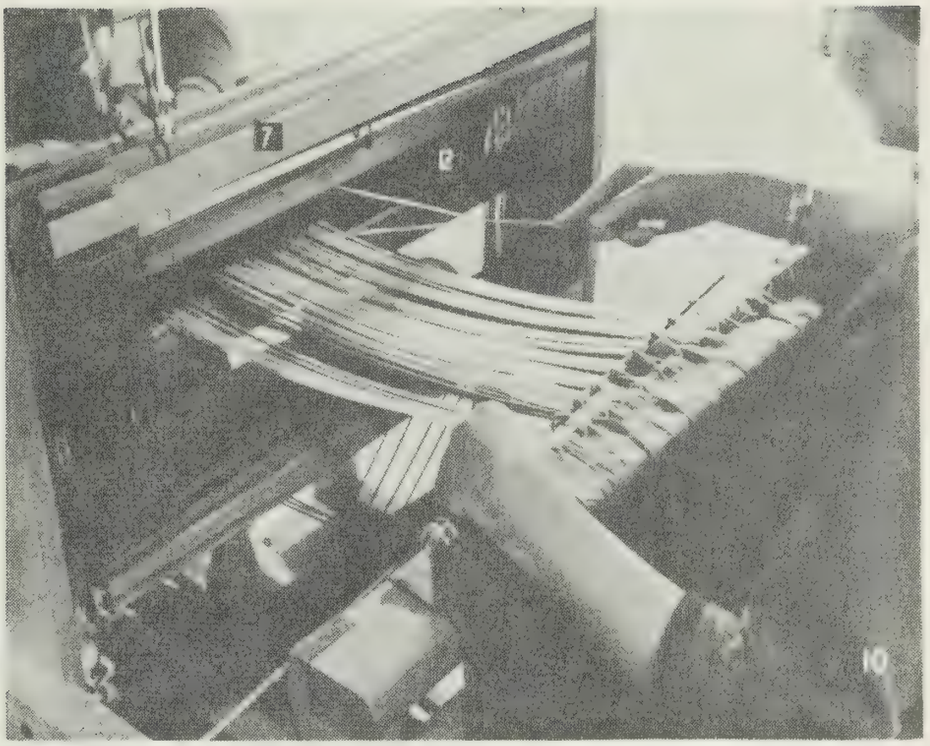
The warp beam rod (28) which is slipped through the looped ends is tied to a second rod similar in size, which is run through the hem of the warp beam apron (29). The apron is tacked to the warp beam (25).

Its purpose is to save warp. Without it, it would be necessary to allow sufficient extra warp to permit the warp to extend from just back of the harness to the warp beam itself, an unnecessary waste of material.

At the front of the loom there is a similar apron and rods. These are called the cloth beam apron (30) and cloth beam apron rod (13).

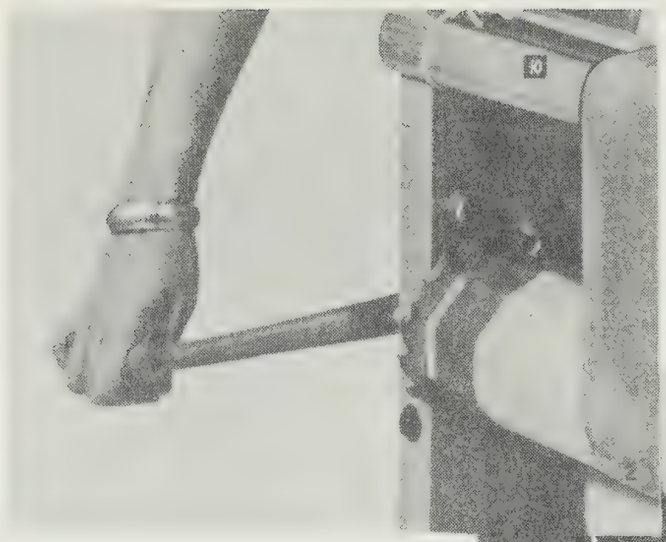


Units of warp ends will be seen lying in the reed (12). It will be noted that the heddles (11) are pushed well to each side of the harnesses (7), an equal number on each side, to provide a clear working space, in the centre of the loom.

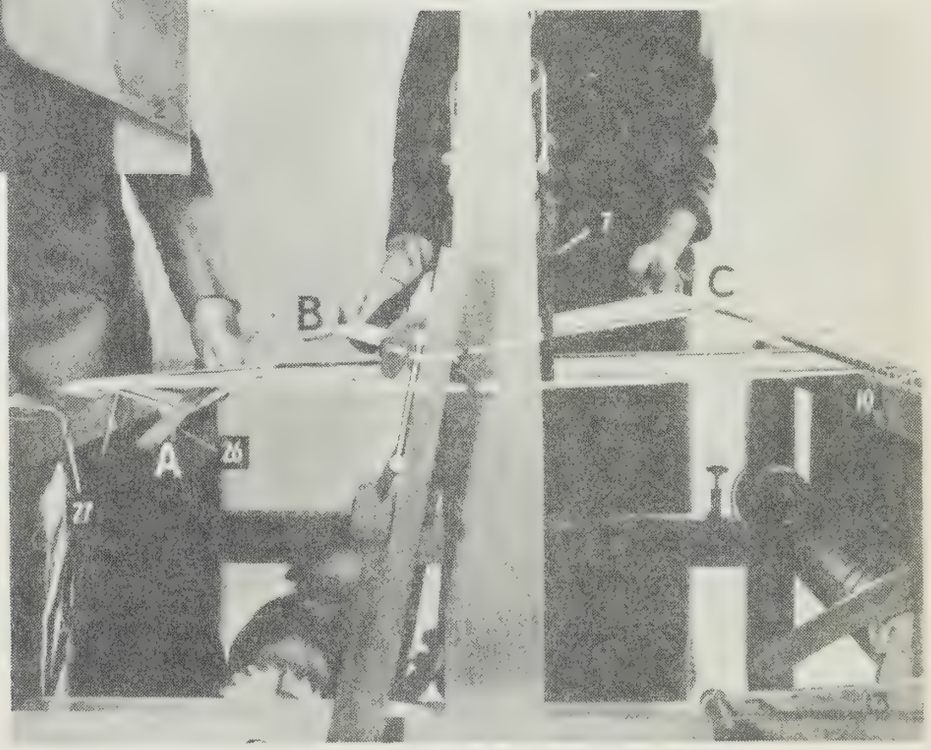


The warp has been practically all drawn through the reed (12) and lies in position for the next step.

The assistant places the last section of warp ends around the warp beam rod (28) completing this part of the warping.



A turn of the warp beam handle brings the warp beam rod up on the back beam (10) where it lies in place preparatory to the next step. Be sure the ratchet wheel is held securely in place with the dog at this point.



During the previous proceedings, the leash or shed sticks (26) have been tied to the front or breast beam (27). It is now necessary to transfer them to the back beam (10). This looks difficult but if the directions are carefully followed even the beginner can accomplish it without difficulty.

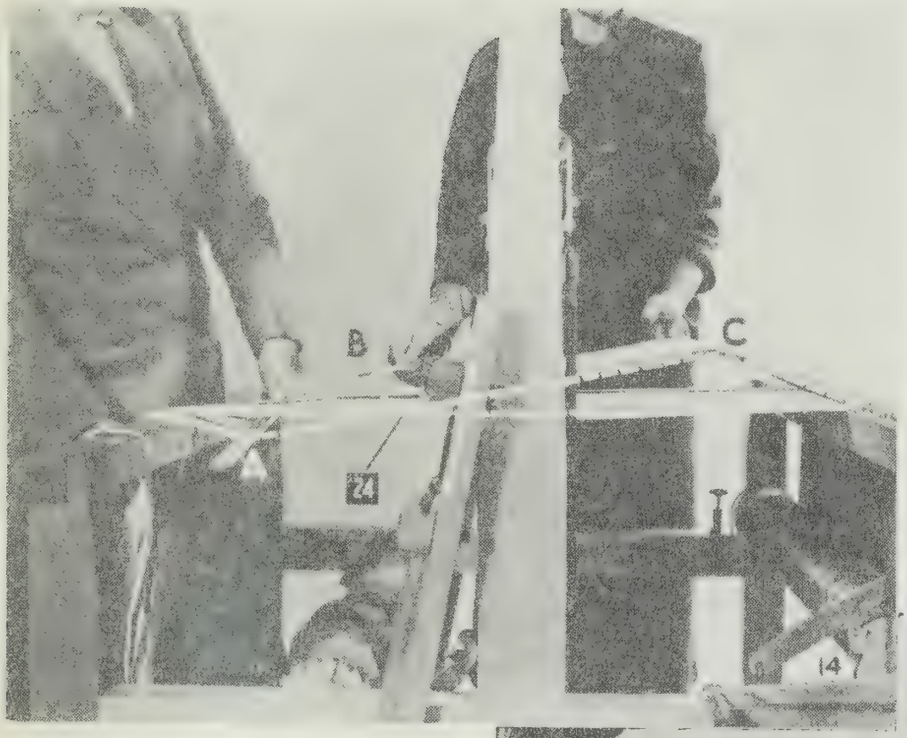
Referring closely to the illustrations it will be noted first of all that the leash sticks have been untied from the breast beam. Stick A is the one which was tied nearest the weaver and stick B nearest the harnesses (7).

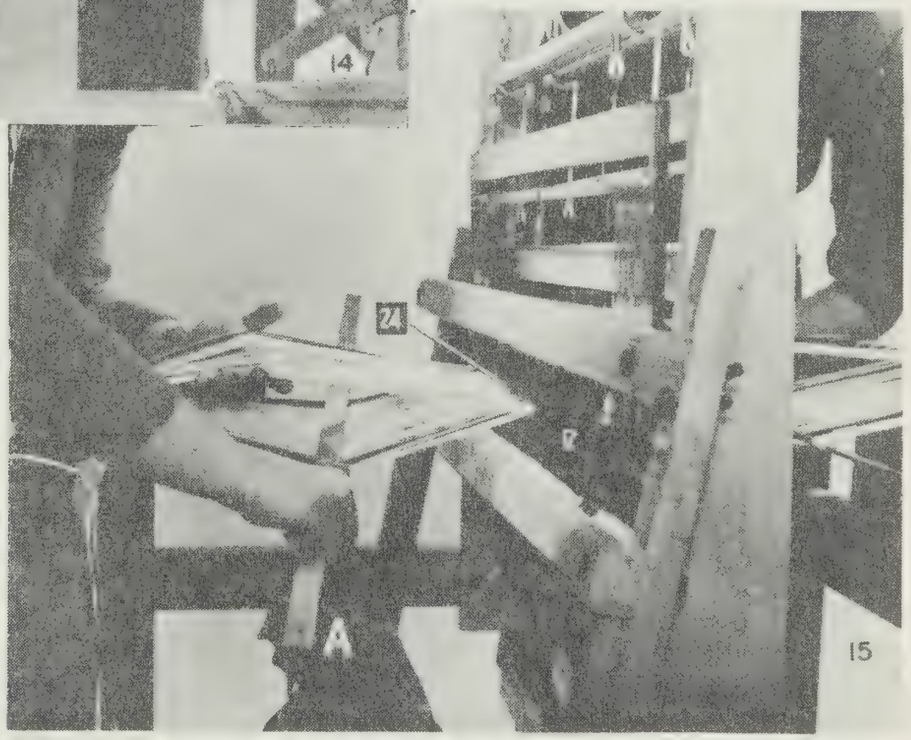
Leash stick A is now pushed down as far as possible by the person standing at the front of the loom. It will be noted that she is holding the warp chain tightly in her right hand. The assistant at the back of the loom lifts leash stick B as high as possible and inserts a third leash stick C in the space or shed between the two sets of threads at the back of the loom near the apron rod.

Note the position of the crossed threads.

Leash stick B is removed.

The dotted line shows the position of the two sheds as they lie in the loom with the cross (24) still lying in front of the harnesses at the point circled.

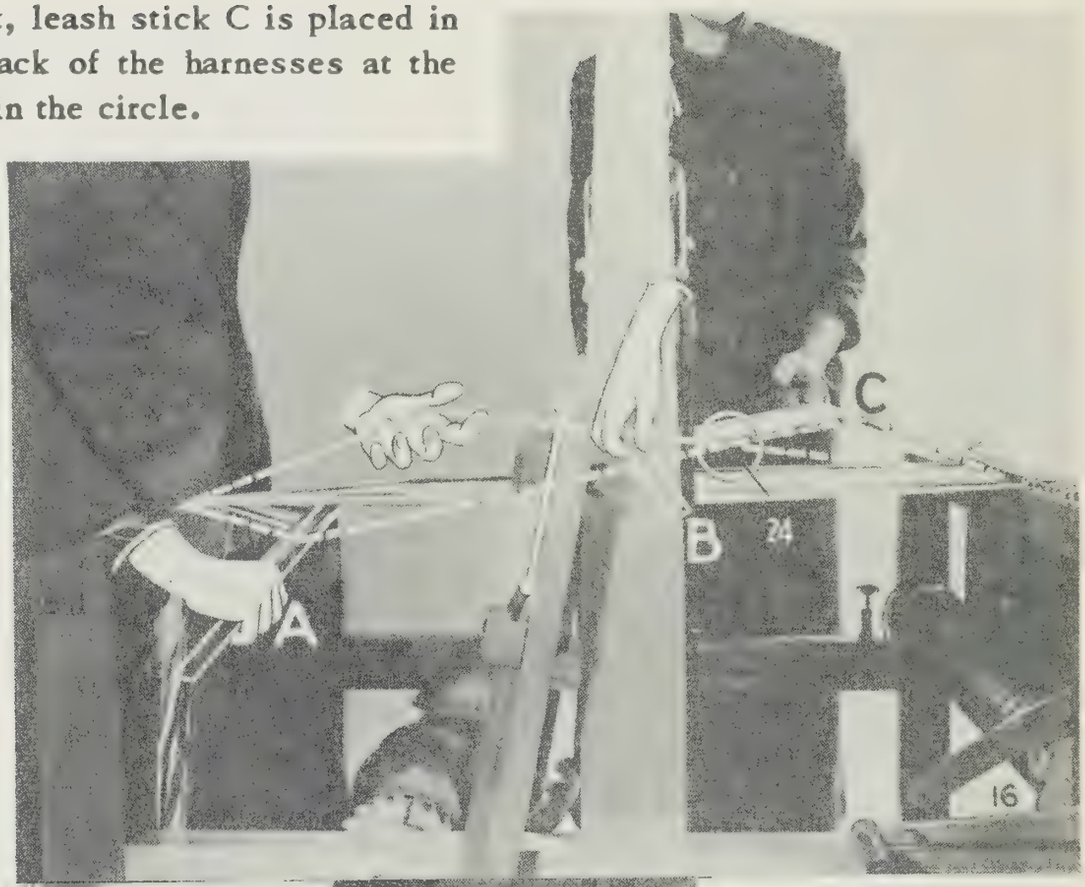


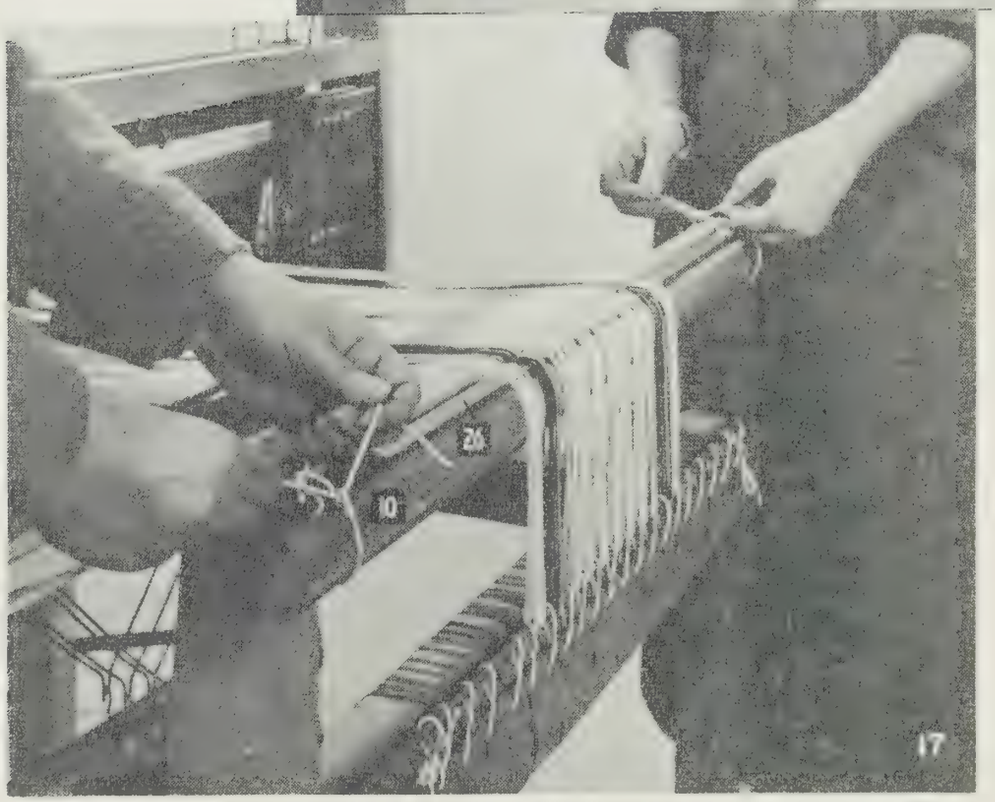


The weaver at the front of the loom now runs leash stick A toward the back of the loom lifting the upper set of threads and pushing down the lower shed.

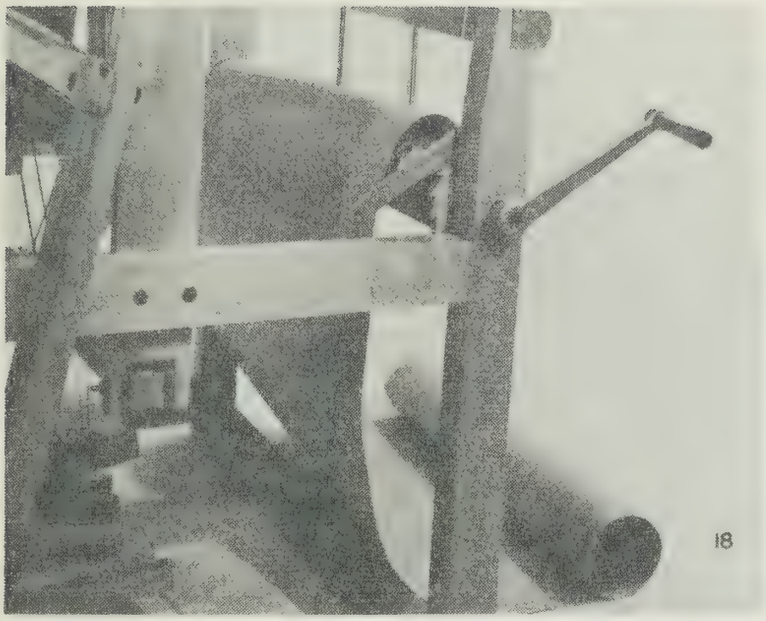
This action forces the cross (24) back through the reed (12).

At this point, leash stick C is placed in the cross (24) back of the harnesses at the point shown within the circle.





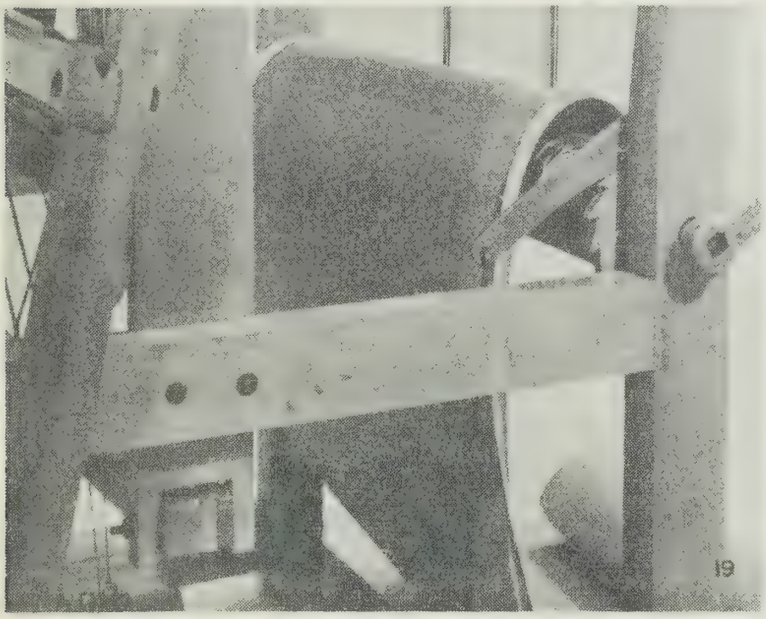
The two leash sticks (26) are now tied onto the top of the back beam (10).



Heavy paper or "winding sticks" are rolled in with the warp as it is turned on the beam.

The sticks or paper insure that the threads lie smoothly with an even tension around the beam.

The warp, when carefully put on, lies as neatly around the beam as thread lies around a spool. The neater the warp the easier and better the weaving.



A one-inch hem should be folded at each side of the paper. This prevents the warp breaking down the edges of the paper at the ends of the warp beam, slipping off and causing trouble. The fold serves the same purpose as the wooden ends on a spool of thread.

The lightest weight bristol board is excellent for winding in with the warp. Do not attempt to use newspapers. They are too soft to be of any value and the print soils the warp.

"Winding sticks" can be purchased from any reliable loom company or can be made at the local lumber mill. They should be approximately 3/4 inch wide, 1/8 inch thick and as long as the warp beam itself, otherwise when the full width of the beam is used, the end threads will likely slip off.

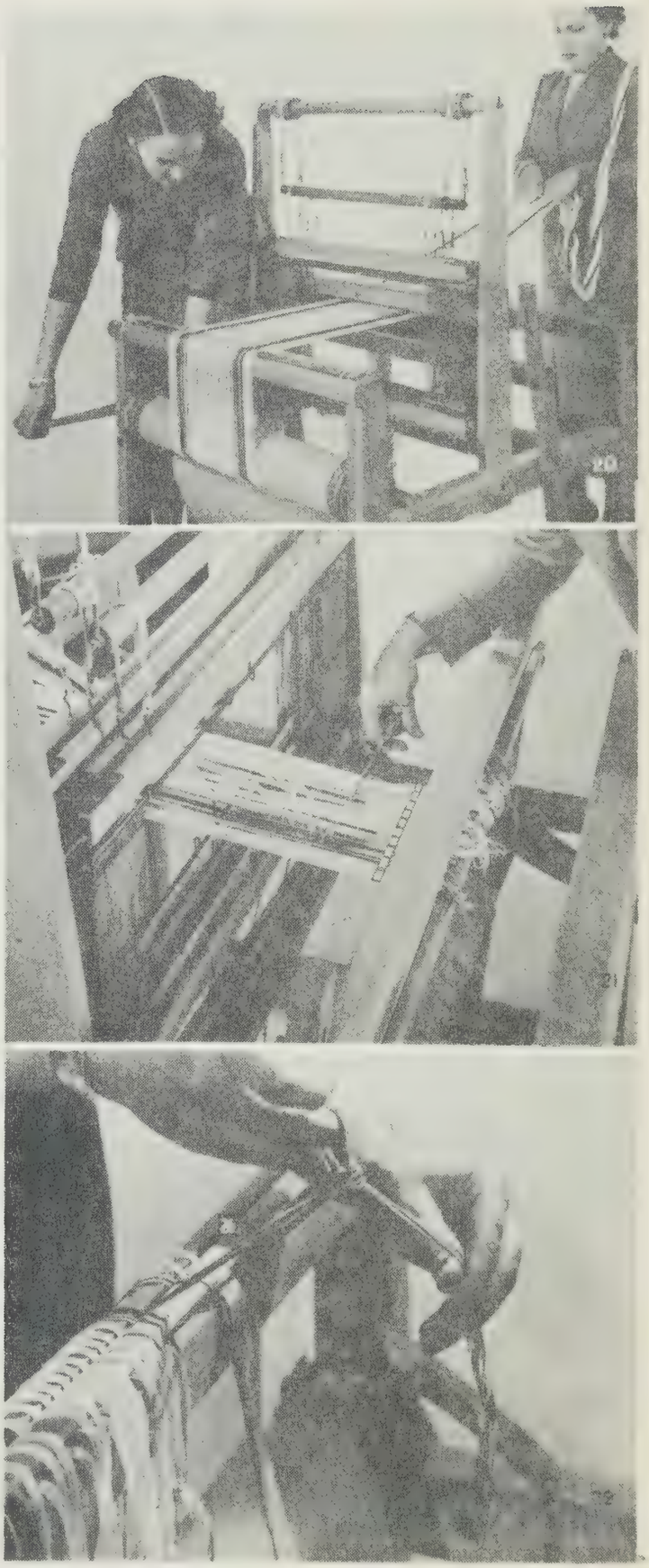
Note how the hands grip the warp – note also the smoothness with which the warp has gone on.

The warp chain should always be held at a good tension, though not so tight that the threads are unduly stretched, nor so tight that the assistant has difficulty in turning the beam.

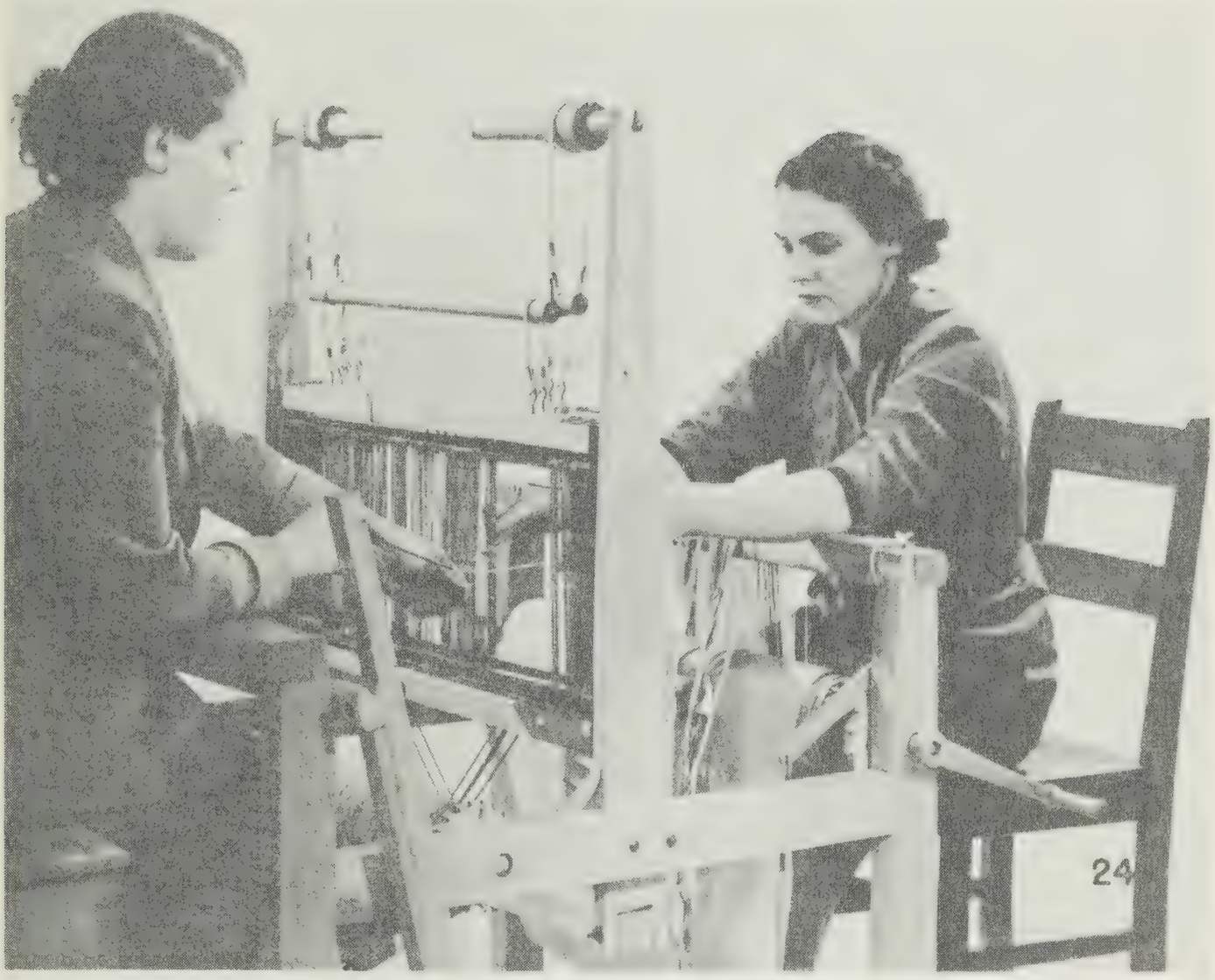
The winding of the warp on the beam (10) now having been completed, the ends can be cut in front of, and as close to, the reed as possible.

The reed has aided in distributing the warp evenly across the warp beam (25).

The cut ends referred to as "warp ends" are now tied in small groups with loose knots to prevent them slipping back through the leash sticks (26).

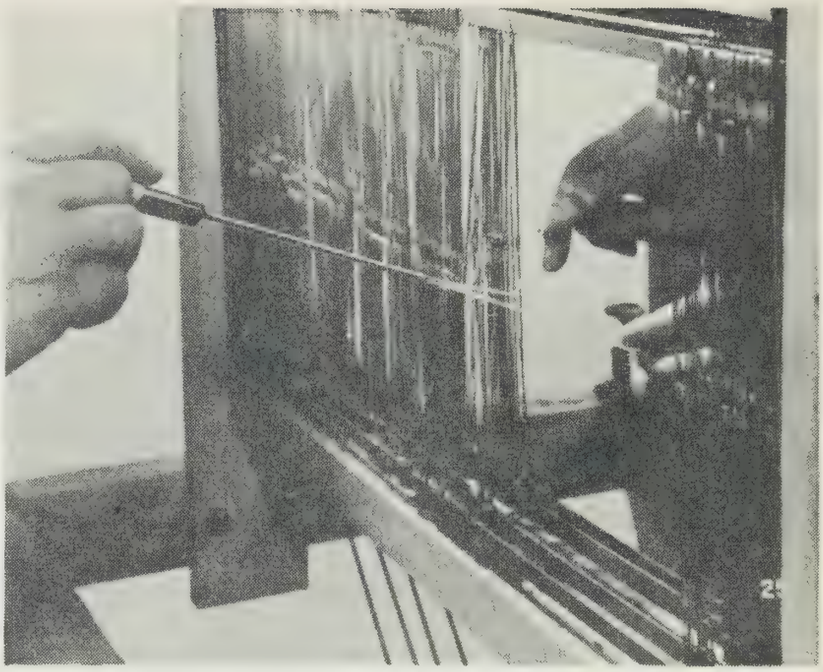


Threading

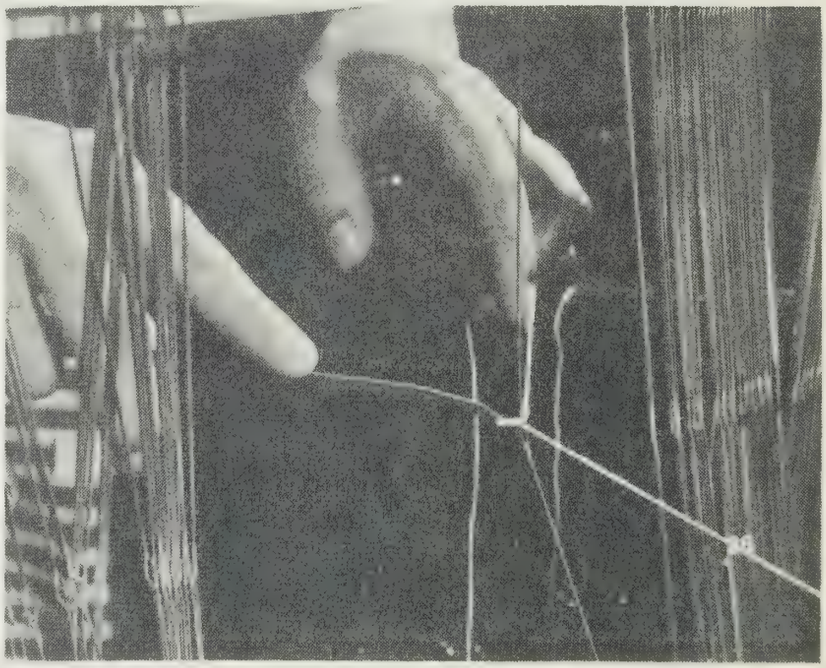


When you first buy your loom it is a good idea to find the centre heddle on each harness and mark it either with a fine colored thread tied through the eye, or else paint it some bright color. Assuming that this has been done on the loom on which you are working, find the centre heddle on each harness and push the heddles lying to the right back to the end of the harness frames. Those lying to the left should be pushed back to the left. This distribution of the heddles assures an even balance to the harnesses, which is most important.

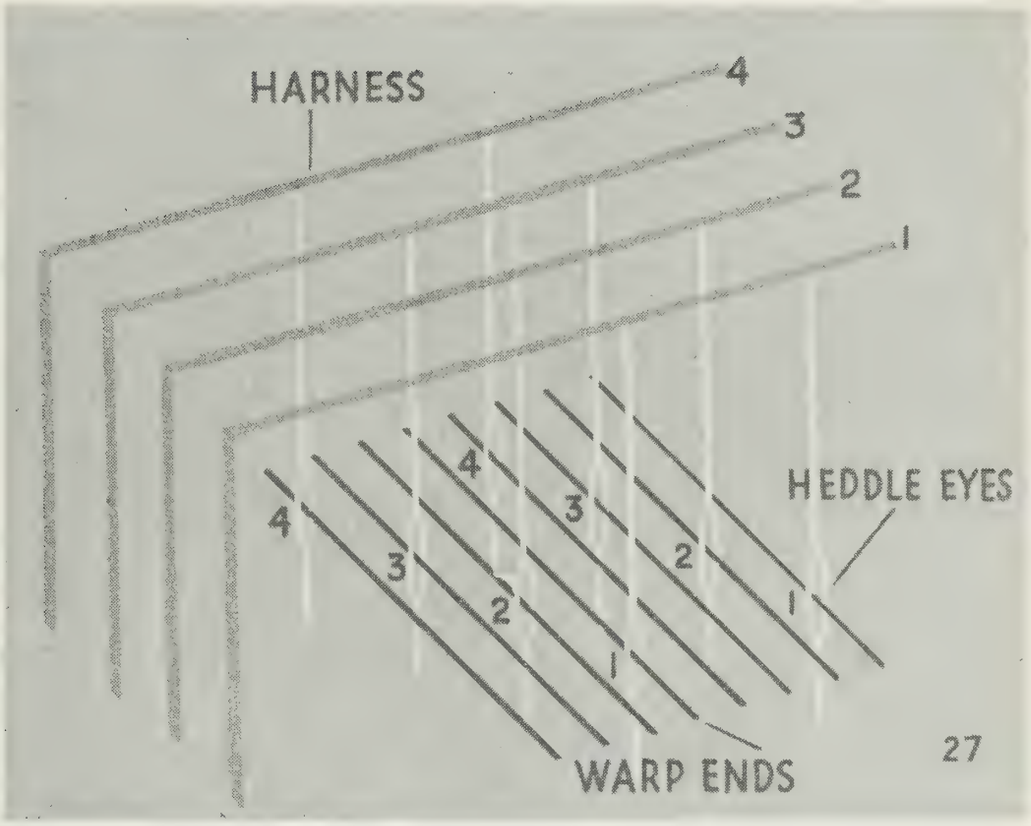
158 threads have been wound for the practice piece. These 158 threads are to be distributed on the four harnesses allowing 39 threads for each harness (The extra 2 are threaded also, but need not bother us now). Sitting at the front of the loom, find the centre heddle on harness No. 1, count off the next 20 heddles to the right and push them all toward the centre of the harness; nowdo the same on the harnesses numbered Nos. 2, 3, and 4.



Care must be taken to pick up the threads in the order in which they lie next to each other in the leash sticks when starting the threading. The weaver at the back of the loom picks up the 1st thread at the left of the warp as it lies between the leash sticks and hooks it over the warp hook which the weaver, seated at the front of the loom has passed through the heddle on harness No. 1. The weaver at the front carefully draws the thread forward and allows the end to drop down. The hook is then passed through the 1st heddle on harness No. 2, then the third thread through the 1st heddle on harness No. 3, then the fourth thread through the 1st heddle on harness No. 4. This completes one unit of the pattern draft. Remember here that when we speak of the 1st heddle on harnesses Nos. 1, 2, 3 and 4 we mean the 1st heddles at the right of the groups of 20 just counted off and moved toward the centre of each harness.



Note position of hook and thread through the heddle eye.



The relationship between the pattern draft, the threads, and the heddles is most confusing to the beginning weaver. If an instructor is at hand many of the puzzles can easily be solved; but when one is working alone the difficulties often remain unsolved for sometime and the weaver works under a handicap.

Frame No. 29 is designed to show the relationship between pattern draft, heddles, reed and warp ends.

It should always be kept in mind:

1. that the filled-in squares represent warp ends;

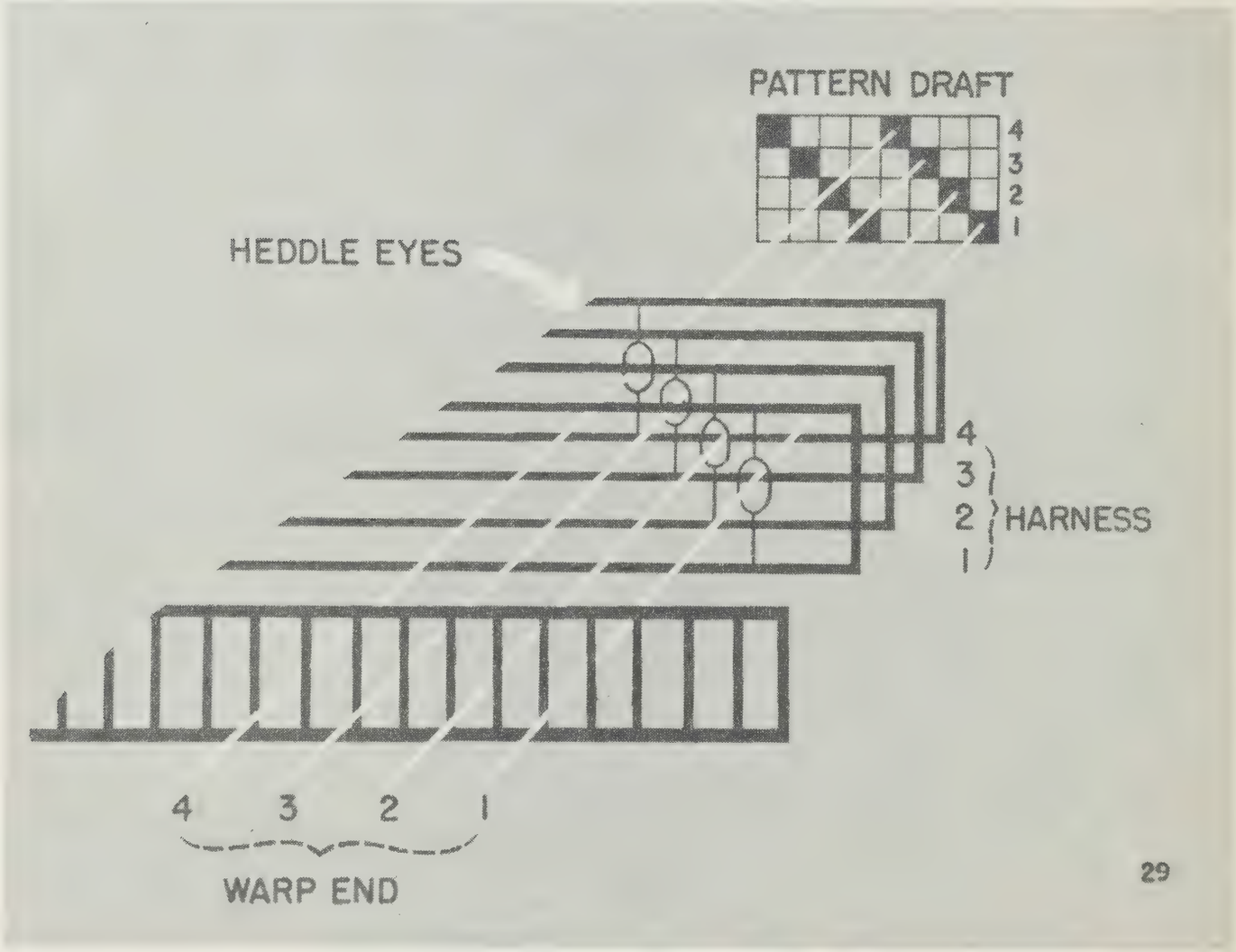
2. that the horizontal bars, numbered 1 to 4 represent the harness frames;

3. that all patterns are read from right to left and

4. that the warp ends are taken in order as they lie in the cross between the leash sticks. One thread will be under stick A, the next over and so on. Should it happen that two threads lie next each other on top or under the same stick don't be alarmed. Just thread in this order; it makes little difference.

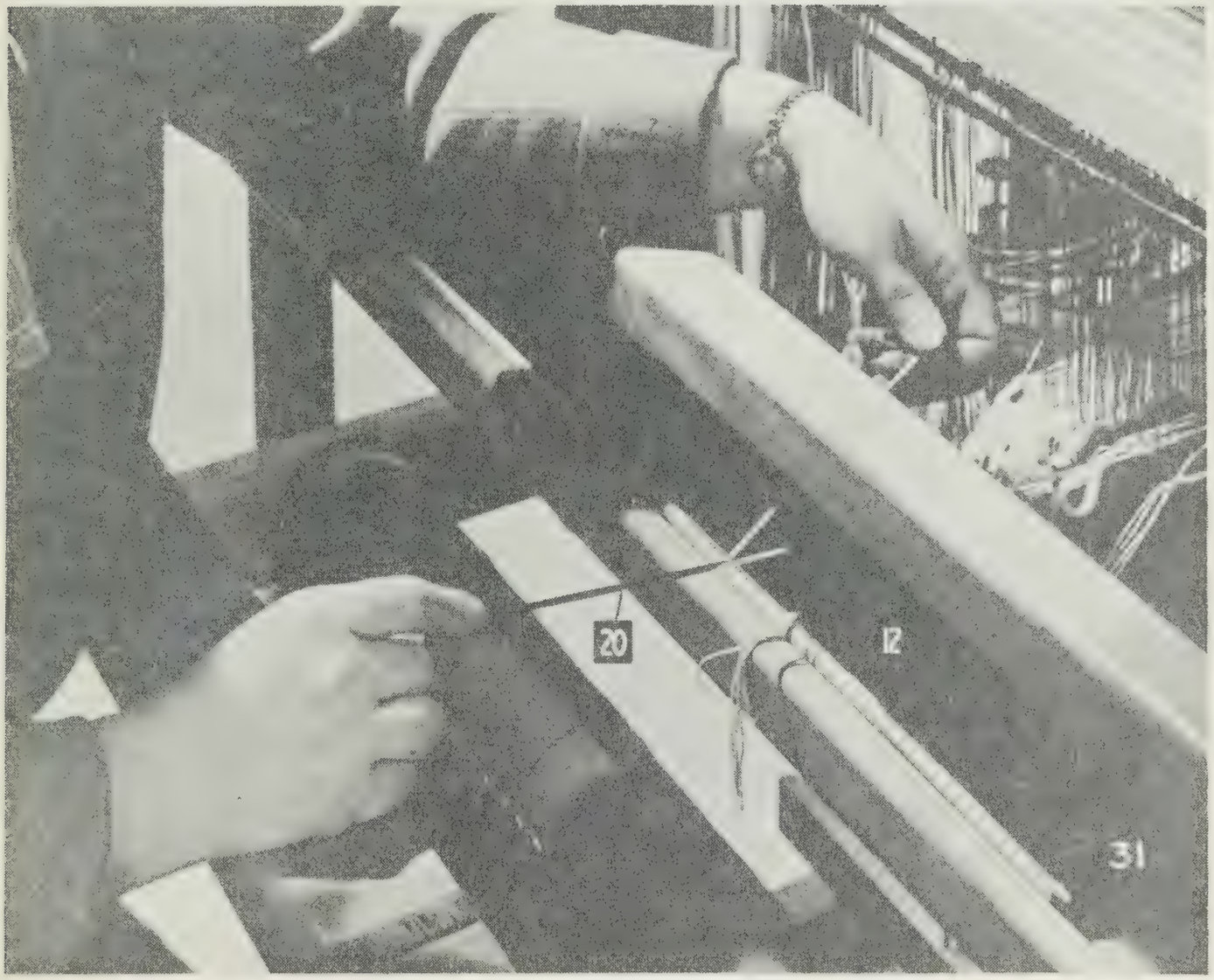
28

There are many ways of writing drafts but the method given here is the one in most common use today.



29

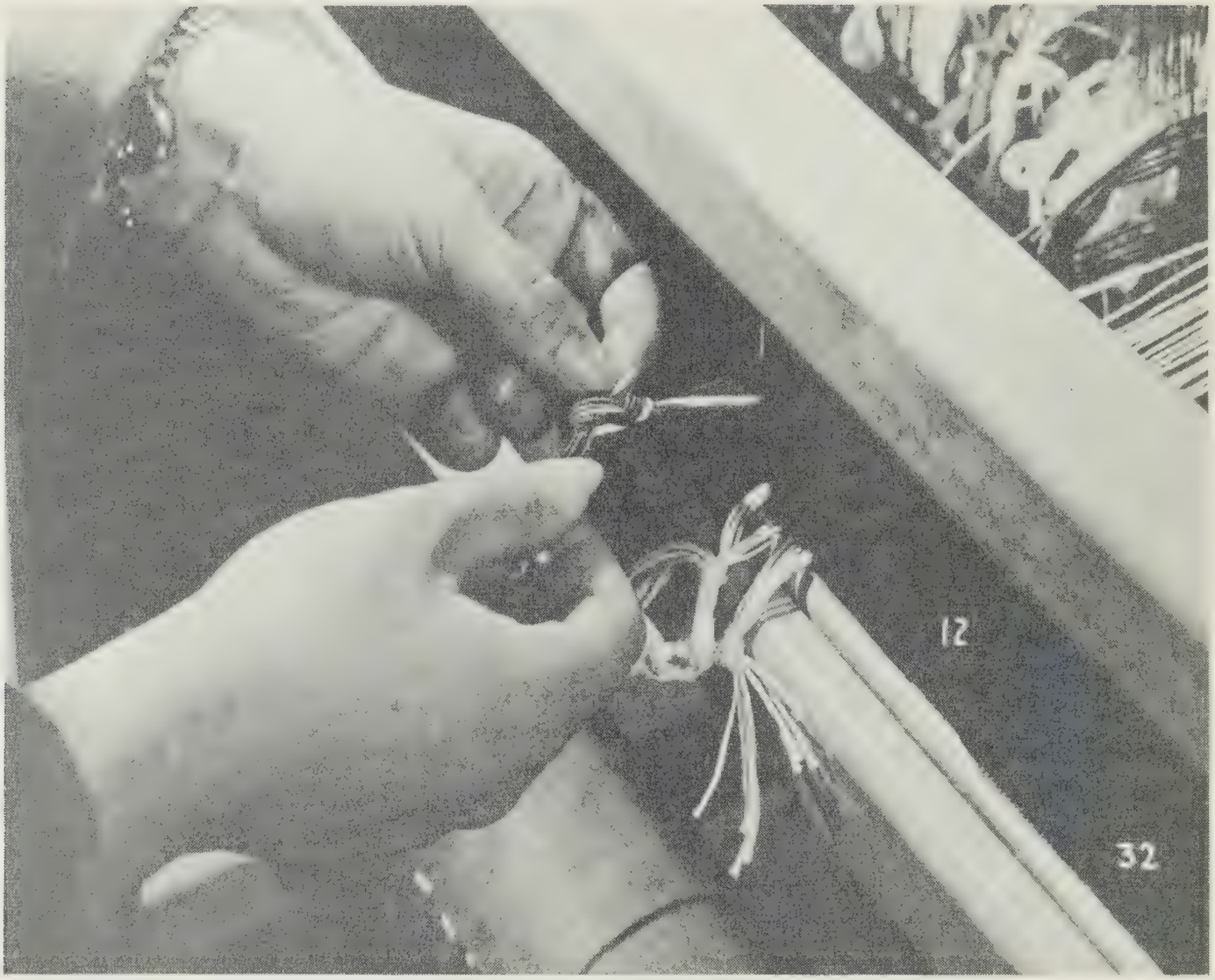
Reeding or sleying the reed



Now that the heddles (11) have been threaded, the next step is to draw the warp ends through the reed (12) with the warp hook (20). This is called sleying the reed.

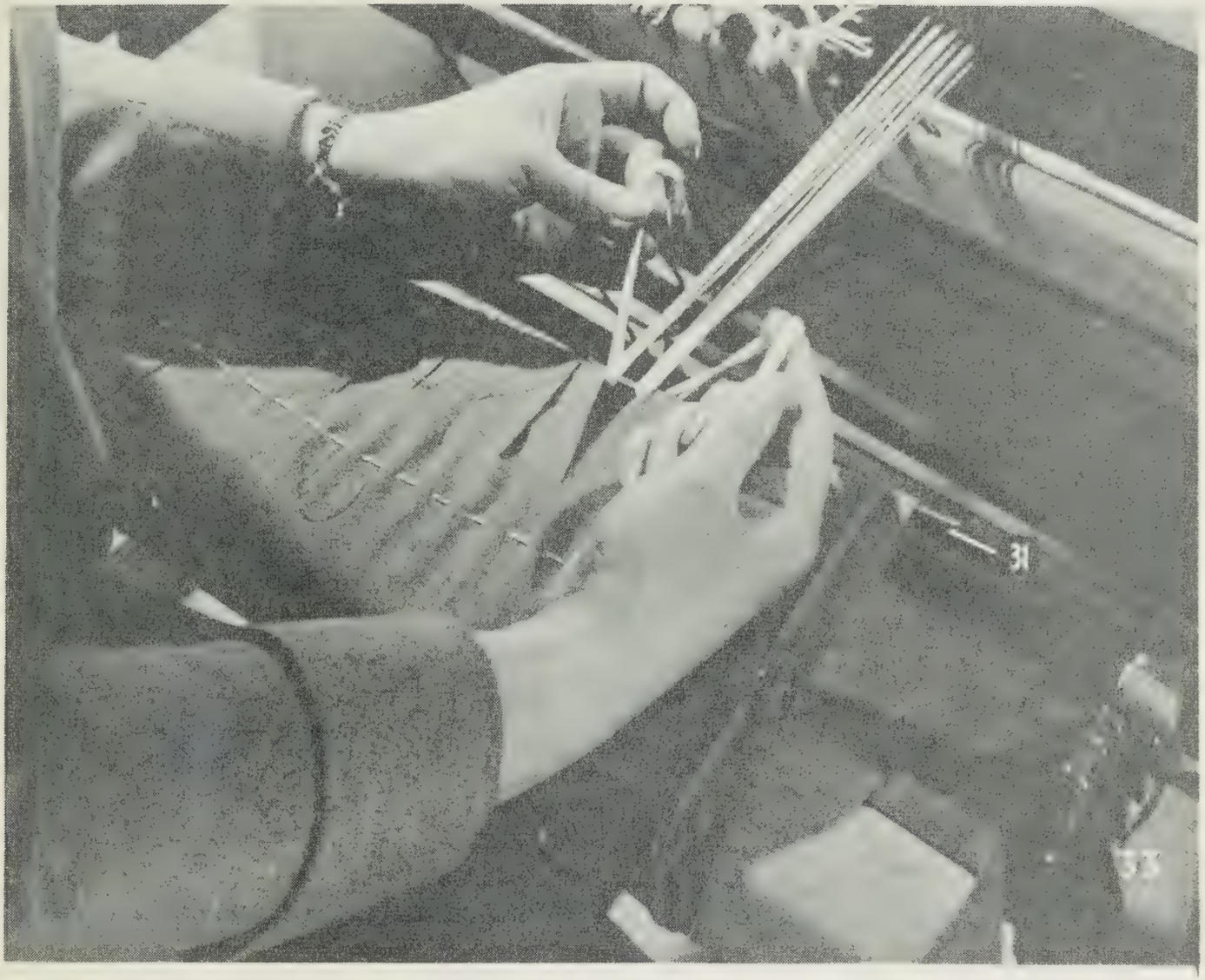
We begin at the centre of the reed and draw through the warp end that lies in the No. 1 heddle marking the exact centre of the heddles as they lie in position on the harnesses. (See frame 24). The next thread to the left, which is in a No. 2 heddle is now drawn through the next dent in the reed, then the third end in a No. 3 heddle and then a No. 4. This process continues always picking up the warp end that lies to the left of the one just sleyed, until all the warp ends are sleyed through the reed.

Now, starting at the centre of the reed again, sley the first end to the right of the warp end sleyed through the centre of the reed. This end will lie in a heddle on harness No. 4. Continuing to the right, sley the ends in order, 3, 2, 1, as they lie in the harnesses. Now start at 4 again and continue in the above manner until the remaining ends are all sleyed.



As groups of 15 or 20 threads are sleyed through the reed (12) they are tied together with a loose knot to prevent them being pulled out of the reed by accident.

To return to our "sleying" for a moment. We are assuming that care has been taken to pick up the warp ends as they lie in order in front of the heddles so that they do not become crossed between heddle eye and reed (See frames 11 and 12 filmstrip No. 3 for remedy). Care must also be taken not to skip any dents or to pull two ends through one dent. These will show up as mistakes and the only remedy is to re-sley the ends through the reed.

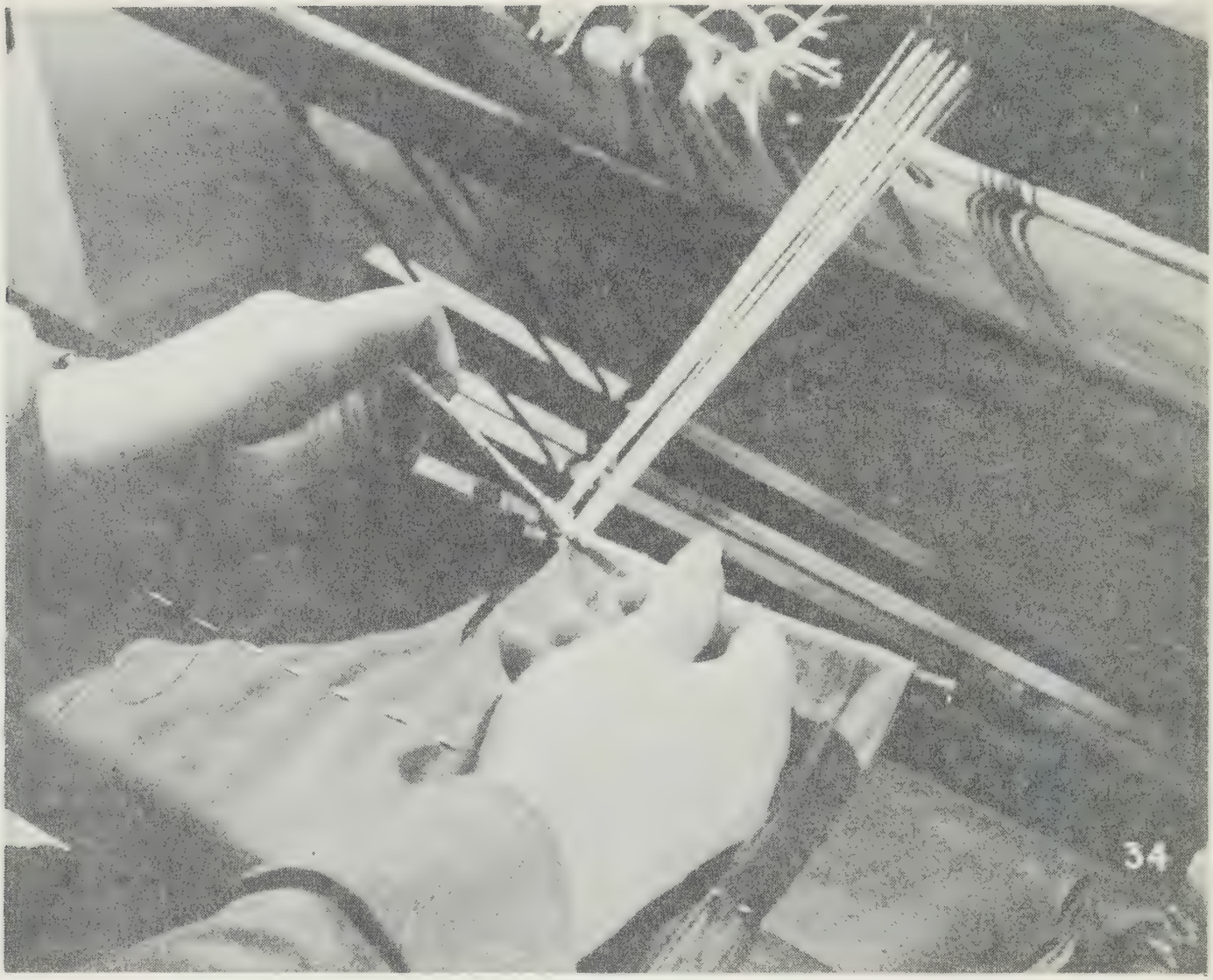


Once the sleying is completed, the tying of the warp ends to the cloth beam rod (31) can begin.

One by one as they are taken up a group of warp ends of about 15 threads is passed around the rod, the ends evened by working any slackness toward the ends, pulling the group of threads toward the weaver quite snugly and tying a double knot. These groups of threads are called "bights" or sometimes "bouts".

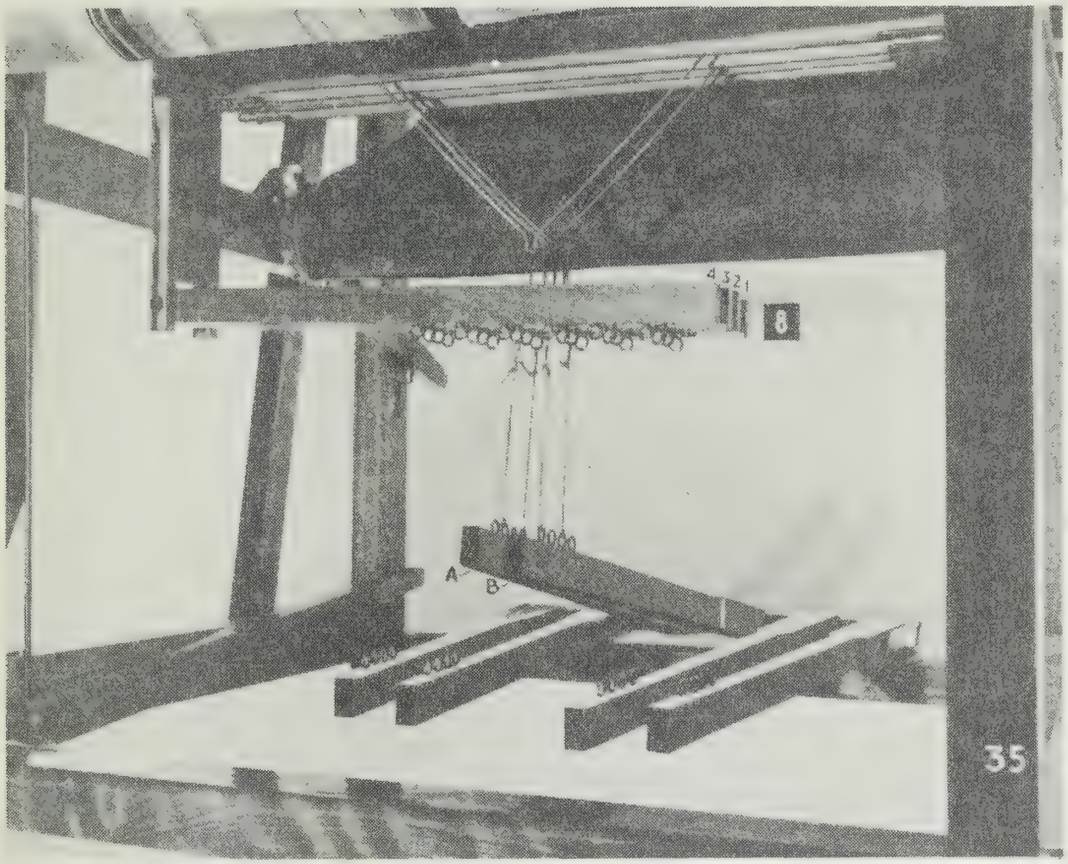
To assure good weaving each group of threads must be pulled to and tied at the same tension.

The process of tying the knot is clearly shown in this and the next frame.



After all the groups of warp ends have been tied, the warp should be tightened by rolling the warp beam forward a notch or two with the handle (Frame 16 Strip 1.)

At this point the fingers should be drawn across the warp at right angles to it. Any uneven tension can immediately be detected and remedied by untying and retying the "slack", or "the too tight", group of threads.



In looking under the loom it will be noted that there are six treadles.

The beginning weaver will use only two of these at first, the middle two, the others will be used later for more advanced types of weaving. The type of weaving with which we are concerned at the moment is called tabby weaving.

To accomplish this we need to:

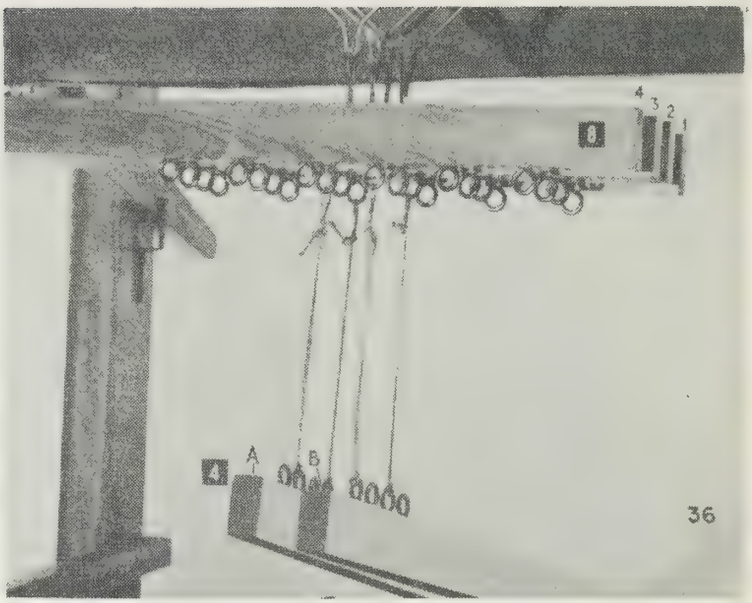
1. pull down harnesses Nos. 1 and 3 together and
2. pull down harnesses Nos. 2 and 4 together in alternating succession.

In order to do this we fasten the cords that hang from lamms (8) Nos. 1 and 3 to the short rope that is fastened to treadle No. 3 (counting from the left when facing the front of the loom). Harnesses 1 and 3 have already been tied directly and singly to the lamms, as have also harnesses Nos. 2 and 4. Lamms directly under harnesses 2 and 4 are tied to the 4th treadle. These treadles are called A and B respectively. Lamms are always tied to treadles with a snitch knot. You will see how one is tied in the next frame.

When tying up the loom, care must be taken to have the tops of all the harness frames and all the lamms in exact alignment or else it will not be possible to get a clear shed. When treadle A is pushed down, all threads in the upper shed as well as those in the lower should be in perfect alignment.

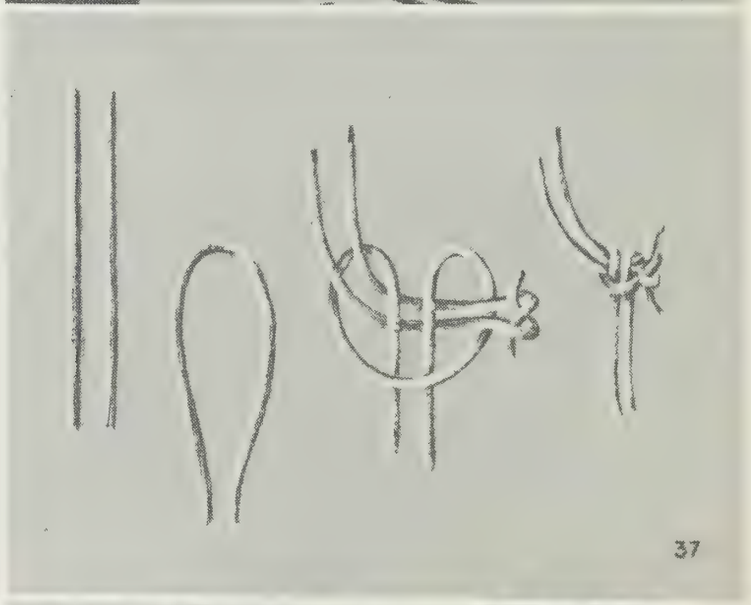
This frame illustrates clearly how the tieup is made.

Note the perfect alignment of all the parts – the rollers, (13) harnesses, (7) lamms (8) and the treadles (4).

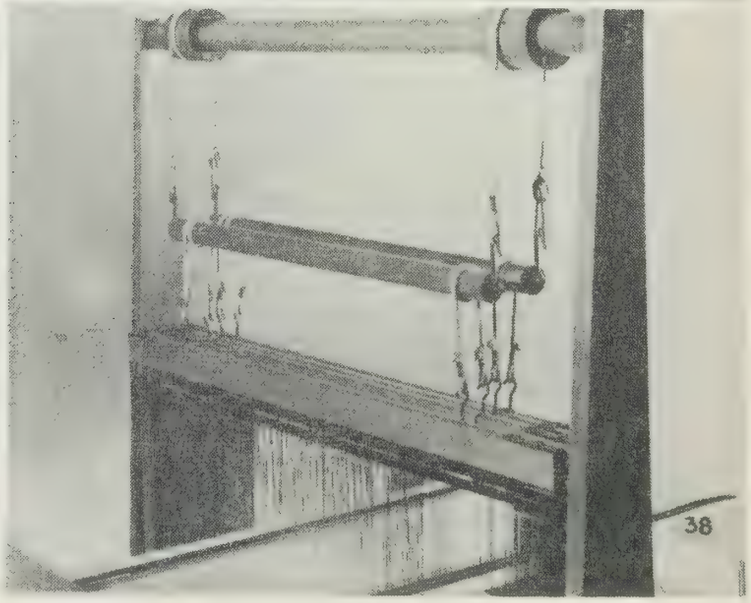


36

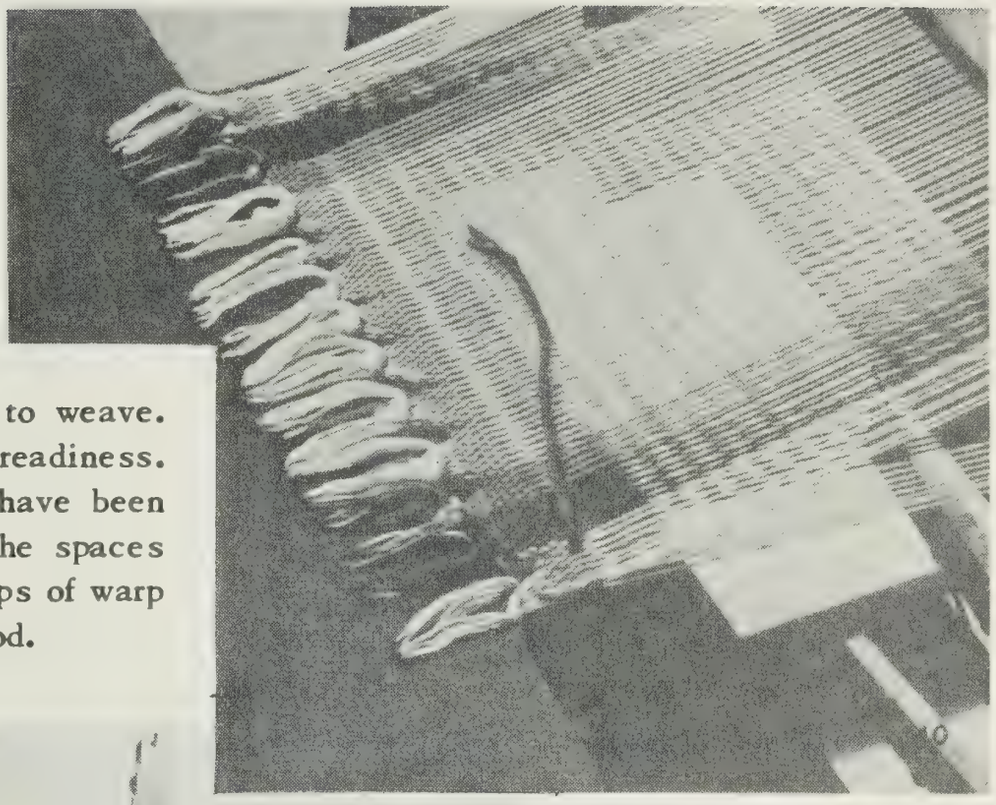
This is how that famous weaver's knot – the snitch knot – is made.


37

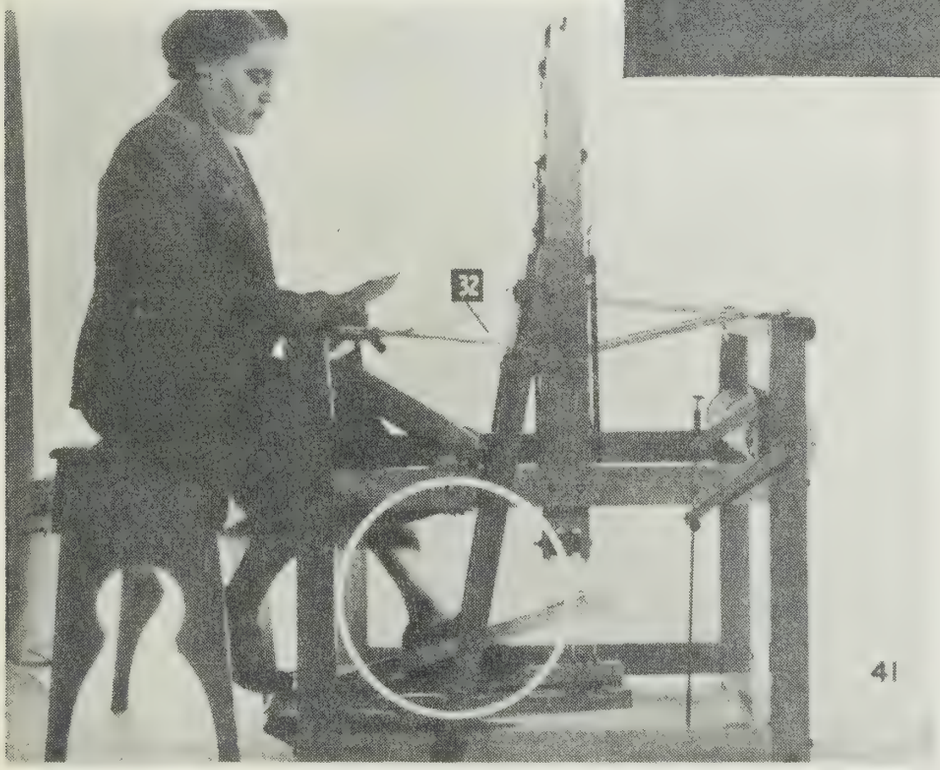
All functional parts of the loom should be kept in good order and all screws and bolts tightened periodically. A well kept loom is an assurance to the weaver that his work will proceed smoothly and he will not be bothered with mechanical difficulties.


38

Weaving

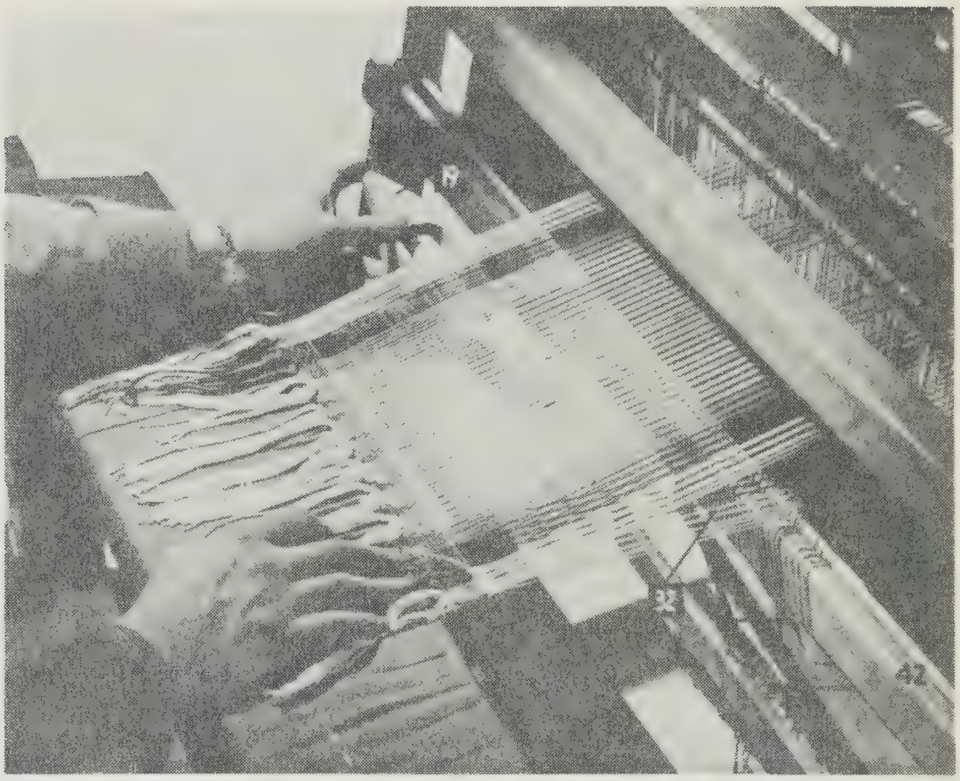


We are now ready to weave. Here we see the loom in readiness. Heavy threads or rags have been woven in to close up the spaces left while tying the groups of warp ends to the cloth beam rod.

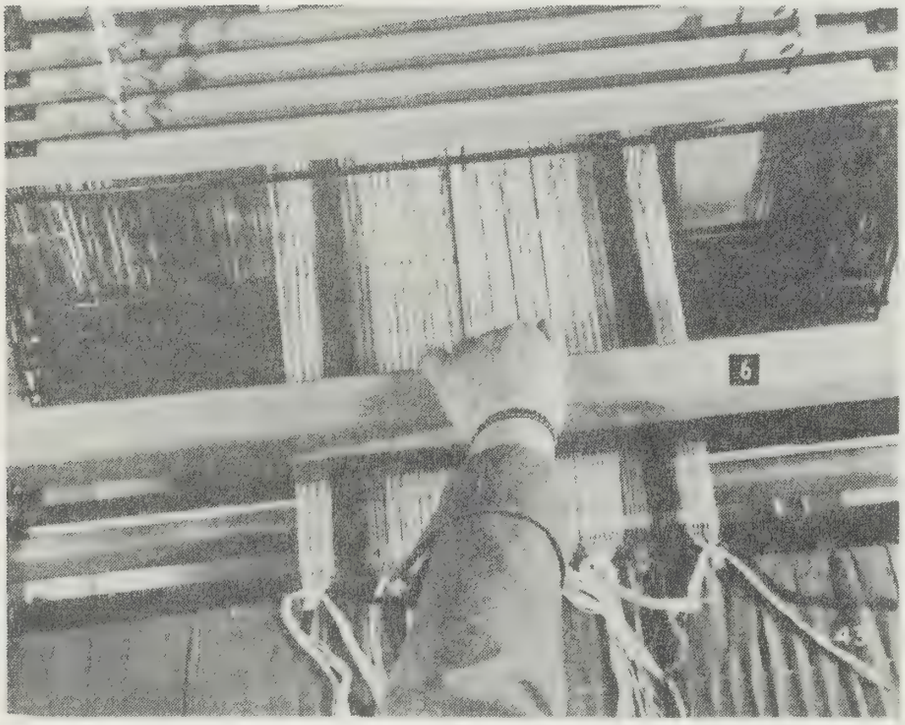


The first step in weaving is to press the left treadle (the one we called A when we tied up the treadles, frame 35).

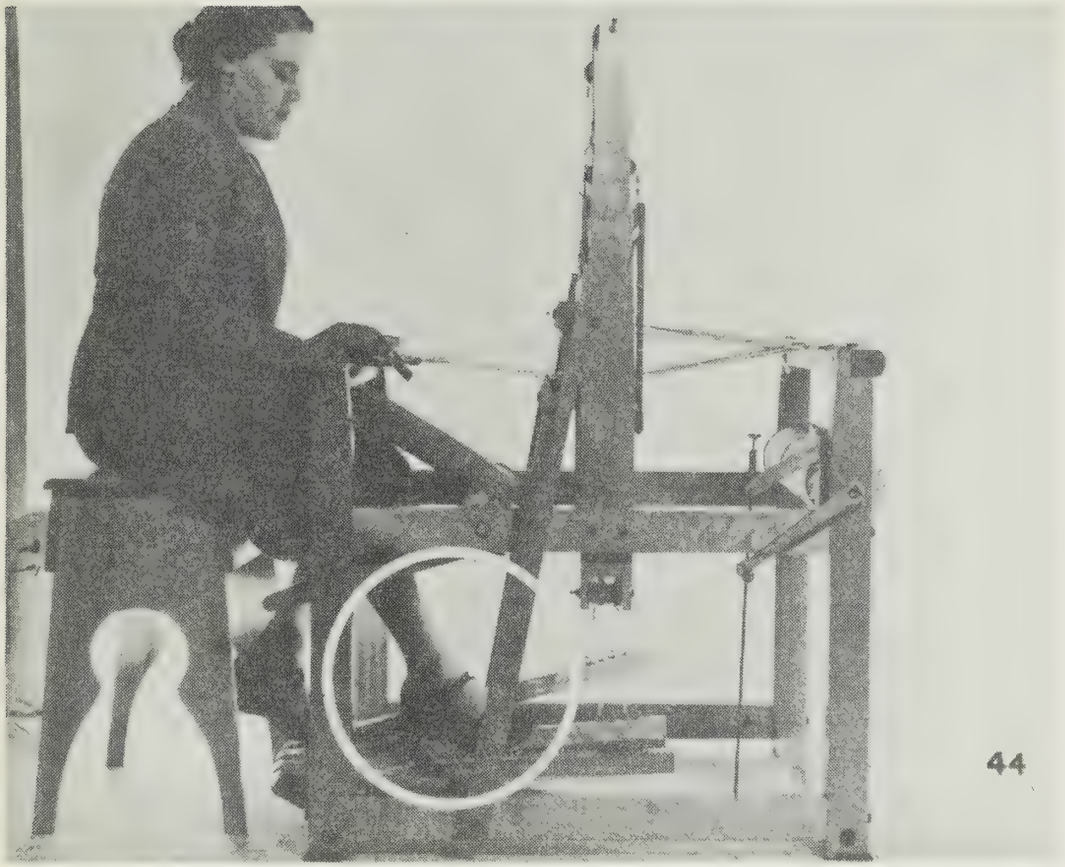
This action opens up a V shaped space, called the shed (32) in front of the reed.



Through this shed (32) the weaver lightly slides the boat shuttle (19), carrying the weft thread, wound on a bobbin from left to right.

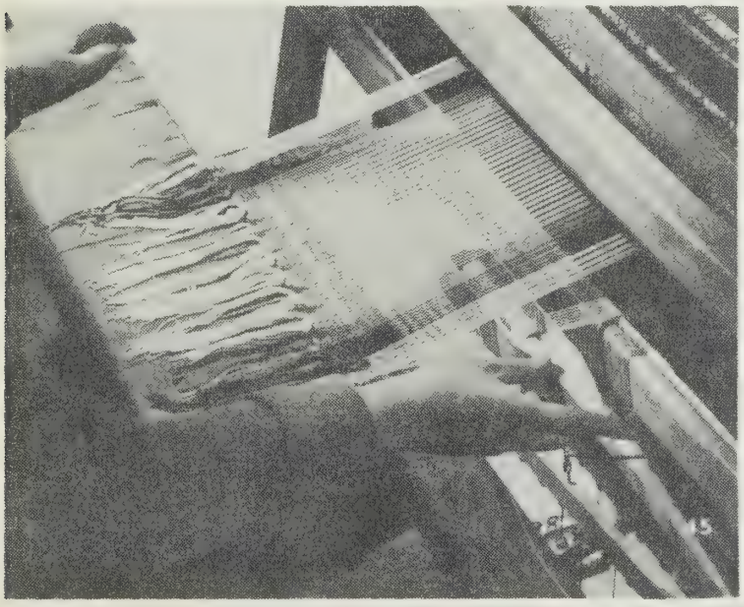


The beater (6) containing the reed (12) is now quickly pulled back to the start of the web and the thread which has just been inserted is beaten back into place.

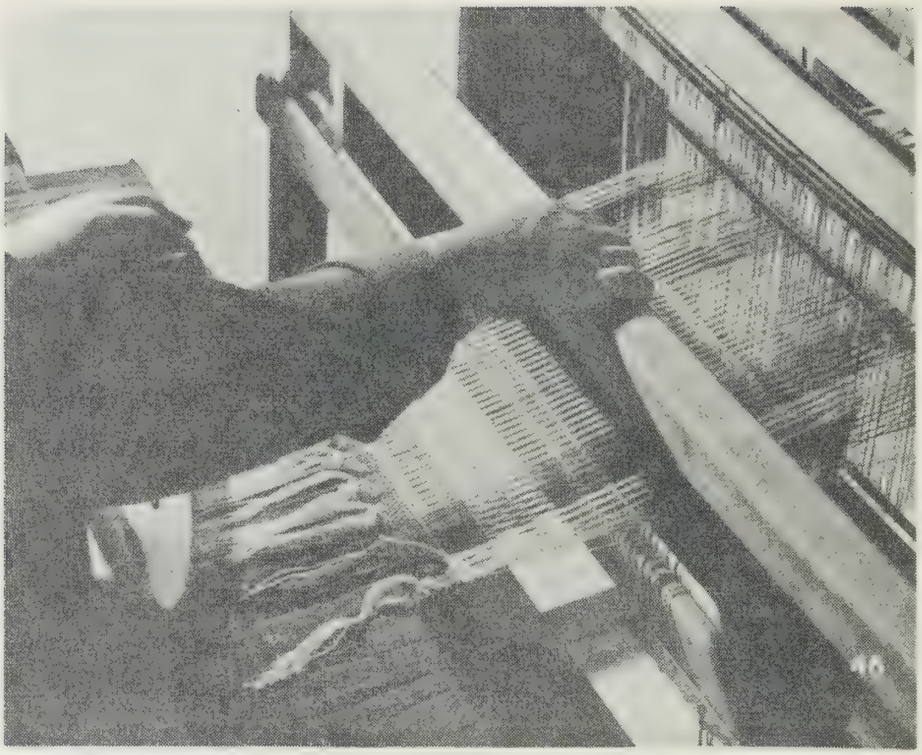


The weaver now releases the left treadle and pushes down on the right treadle (which we called B) opening up the opposite shed, at the same time giving the newly entered thread another beat.

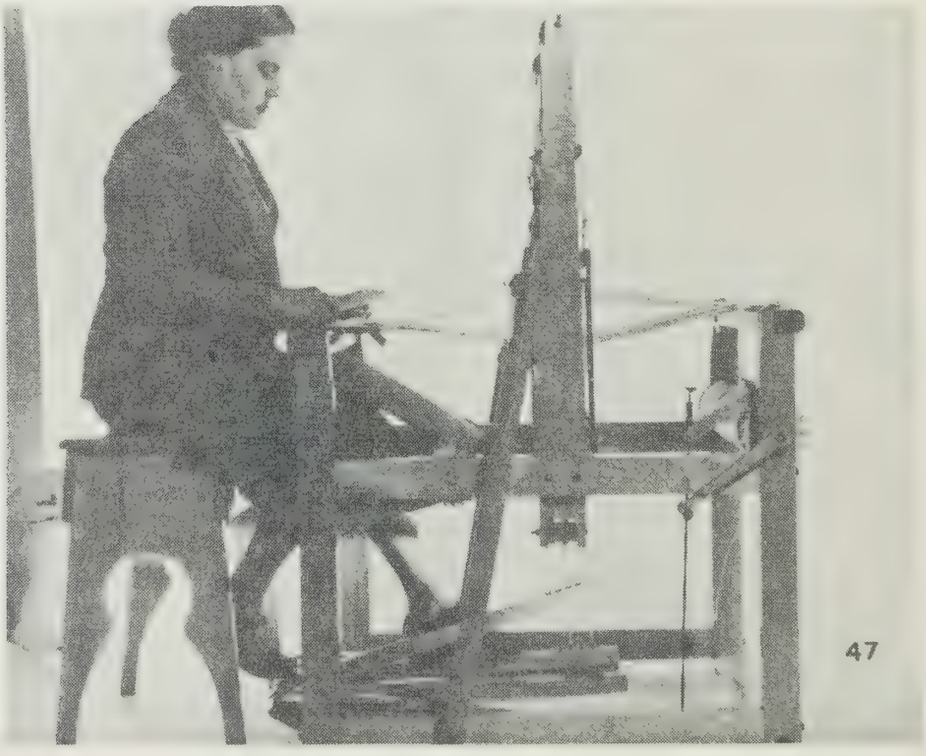
When treadle A was pressed down, the threads in the lower group were those threaded through harnesses 1 and 3; threads through harnesses 2 and 4 were in the top row of threads. Now the sets of threads are reversed, the 1's and 3's are up, and the 2's and 4's down. It is the crossing of these two sets of warp threads that hold the weft threads in place and forms cloth.



The shuttle is now thrown or slid through the shed from right to left.



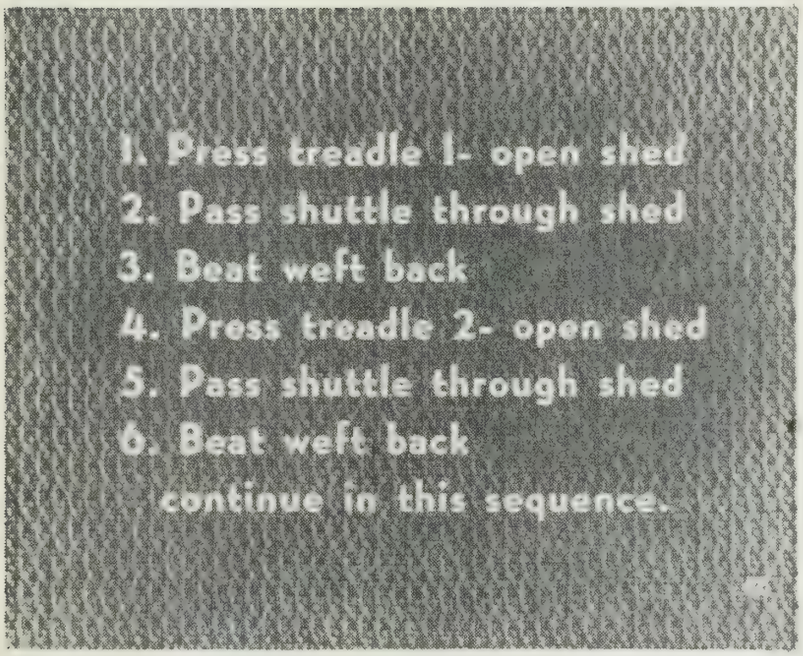
This newly entered thread is beaten back into position.



We are now ready to repeat the sequence, starting again with the left foot.

We have started to weave!

The order of treadling for the tabby weaving with which we are concerned at the moment is as follows:

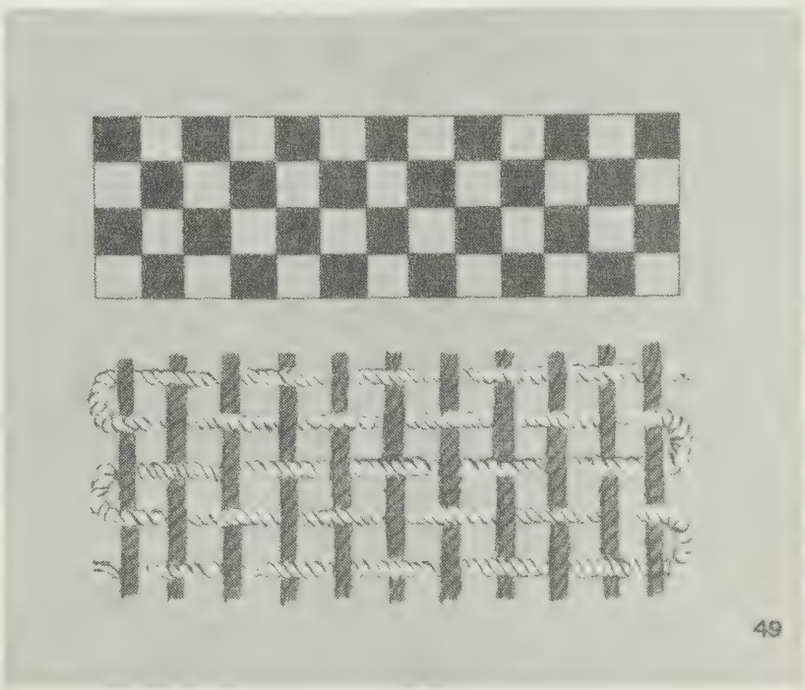


Continue with the sequence.

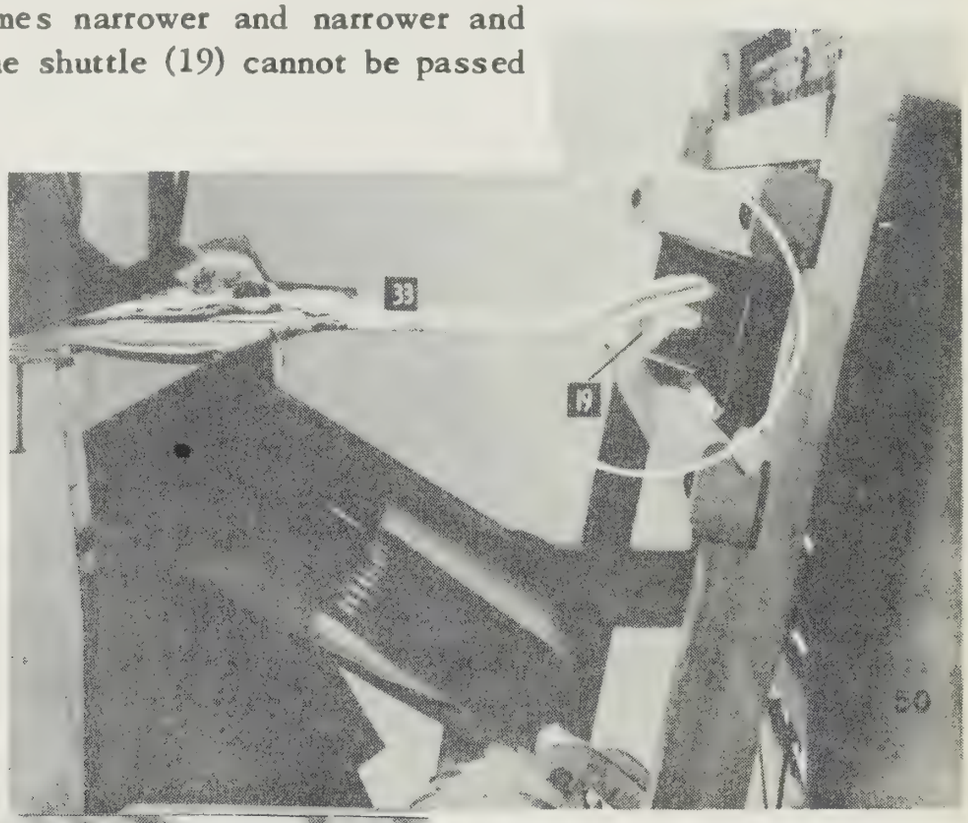
For more advanced patterns and threads there are many deviations on the above treadling which the weaver learns as he progresses.

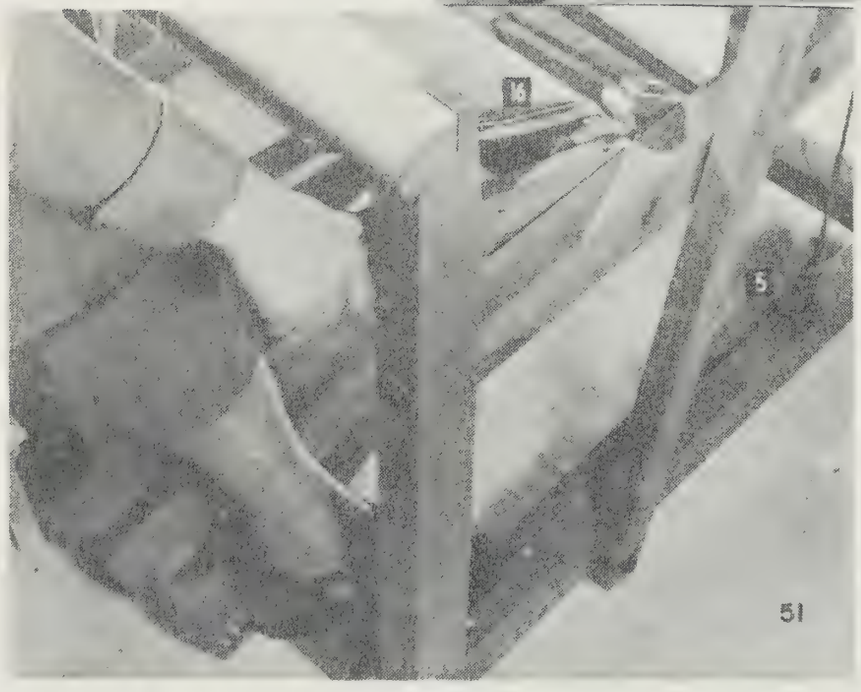
The most simple form of weaving is darning, wherein one set of threads is interwoven with a needle in alternating sequence across another set of threads, stretched at a tension. On a loom this is achieved mechanically, but always one set of threads crosses another in simple or intricate succession, to form cloth.

In tabby weave, the threads cross each other in the order shown in the frame, over and under each thread in alternating succession.



As the web (33) builds up following the insertion of the weft threads, the distance between the edge of the web and the reed becomes narrower and narrower and the shed so small that the shuttle (19) cannot be passed through.

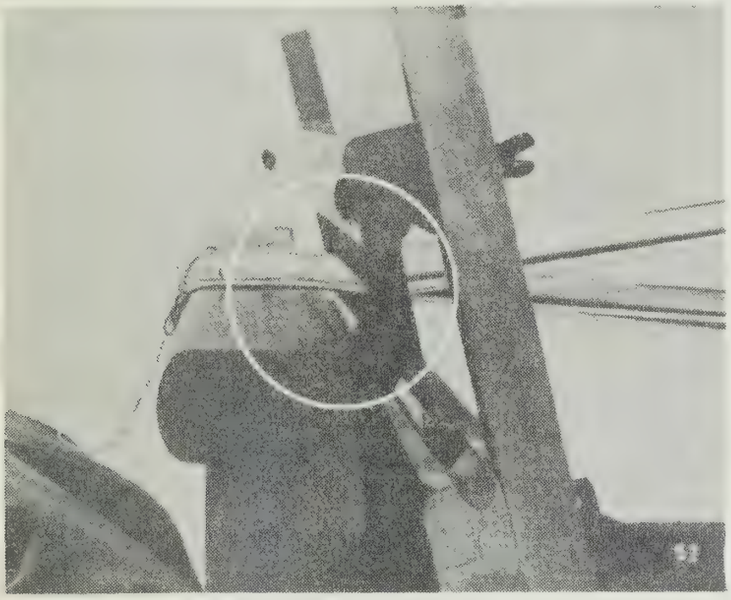




In order to remedy this the weaver steps on the ratchet wheel brake (5), which lies just inside the right front upright of the loom. This releases the warp beam and the warp can be wound toward the cloth beam (16).

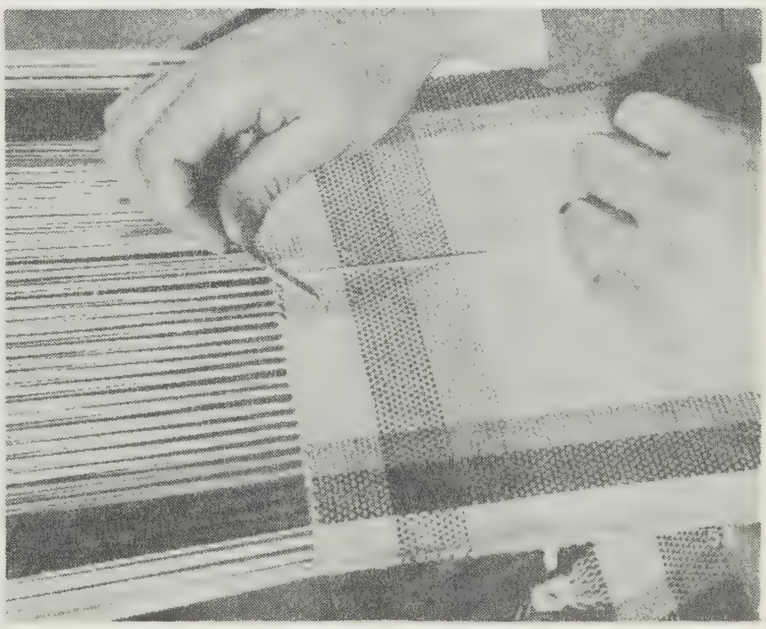
Care must be taken not to wind so close to the breast beam that the beater cannot beat it properly.

Experienced weavers wind their warp back short distances at frequent intervals rather than wind it infrequently and for greater distances. They claim by so doing they can maintain a steadier rhythm and weave a better piece of cloth.

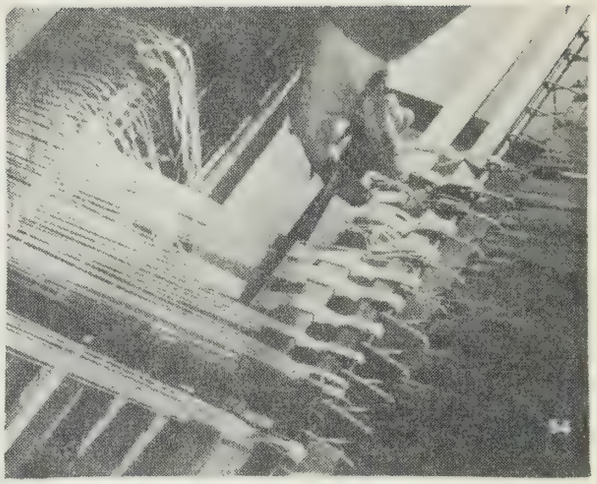


When the woven web becomes long enough to roll around the cloth beam it is advisable to wind in a heavy piece of paper, such as was wound in with the warp, to cover the knots and any roughness that may be present where the cloth beam rod winds around the cloth beam. These knots, if uncovered, tend to press into the web, stretch the threads and cause an uneven tension. Two or three turns of the paper around the beam as the weaving proceeds, are all that are needed.

Having woven the desired amount of material, the weaver completes her web by hemstitching across the end which lies next the reed. This prevents the weft threads slipping out of place when the tension is released and the warp threads cut.



The first piece has been woven and can now be cut from the loom.

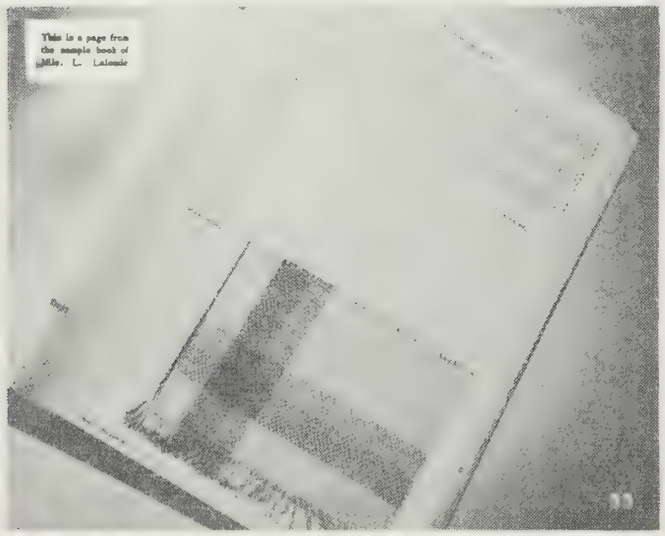


With pride and excitement the weaver can view her work.

Are the selvages even, the edge threads drawn in neither too tightly nor left with little loops hanging out?

By holding the piece in front of a light the evenness with which it has been beaten can be checked. If unevenly beaten there will be streaks running across the web showing where some threads have been packed closely together, while others have been left too far apart. If there are "runs" showing lengthwise in the piece a mistake has been made in the sleying or a warp thread has been broken and not replaced.

The beginner should not expect the first piece to be perfect. Practice and experience in handling one's materials are required to make perfect weaving.



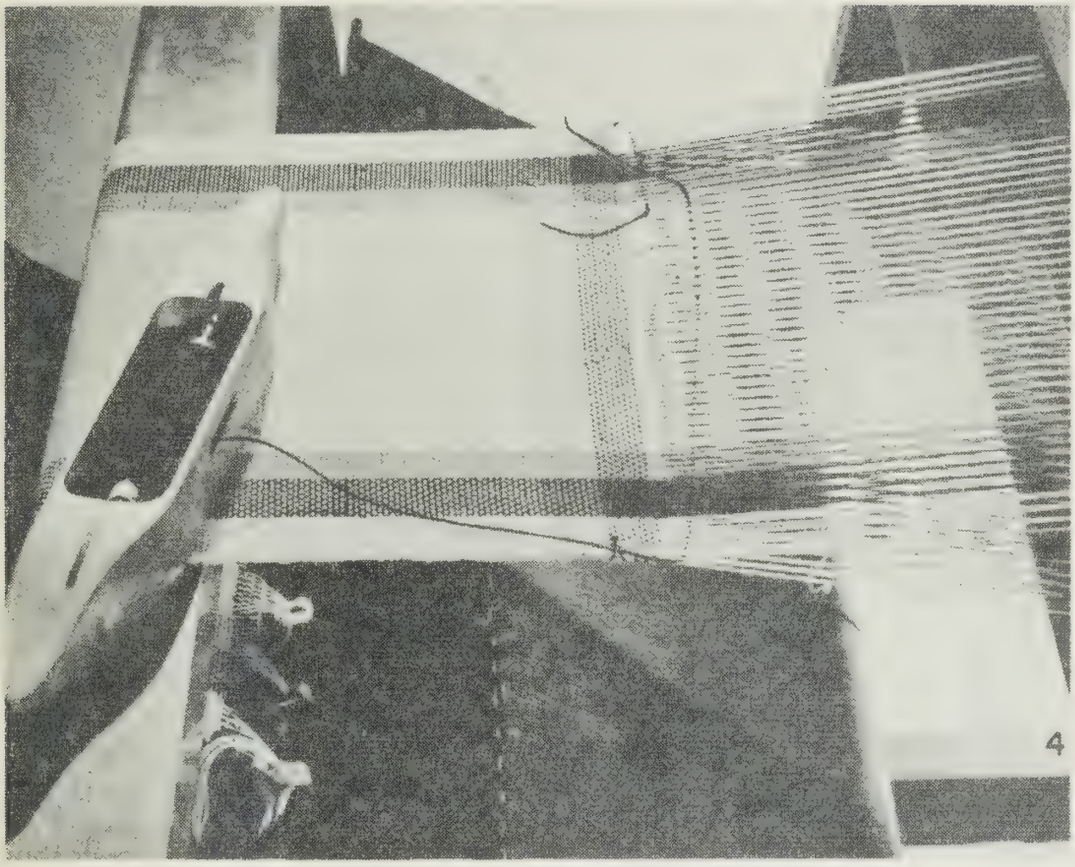
It is always a good plan to put on too much rather than too little warp.

Even from the first every weaver should keep samples and exact details covering every piece of weaving done.

These notes should list the pattern draft used and its source; material used for warp and weft, article woven, amount and cost of material and suggestions for any changes should the same article be woven again.

To the beginner these notes may seem very detailed but their value will soon be appreciated as they provide a complete record of all weaving done through the years and serve as a basis for comparison and growth.

General Information



It is the attention paid to the many small details of weaving that distinguishes the careful weaver from the careless one.

One of these is the care with which new weft threads are joined or colored border threads added.

All new threads should be joined at the selvage, never in the centre of the web. At times this may mean the wasting of a length of thread but the end result is a more perfect web and the wastage is justified.

It is rarely necessary to lap the ends for more than an inch in order to keep them in place. When adding a new weft thread, open the shed and place the end of the old thread into the shed for about 1 inch then bring it up through between the warp threads and let it lie on the surface of the web. Insert the shuttle carrying the new thread into the same shed allowing the end of the new thread to lap over the old thread about 1-½ inches. Press the thread back into position very gently against the edge of the web with the beater. If the two ends overlap about an inch at the selvage, the new thread will not pull out. If the two ends pull apart and leave a space, relap them for a greater distance. After a few shots, or picks, have been woven, the end which lies on the web can be cut off close to the fabric. The join is hardly noticeable.

The method used to start and end colored border threads is slightly different.

The thread that is being used for the main body of the web is brought through the shed and cut off about 2 inches beyond the selvage. Without changing the shed, the cut end is turned around the edge outside warp thread and brought up into the shed, to lie beside itself for about 1 inch. The end is then brought up through (between) the warp threads where it lies on the web, to be cut off later. The shed is now changed and the shuttle with the colored thread is thrown in, leaving the end of the new thread extending 1½ inches beyond the selvage. This end is then turned around the edge warp thread and brought into the shed where it lies parallel with the new colored thread for about 1 inch. The end is then brought up through (between) the warp threads to be cut off later.

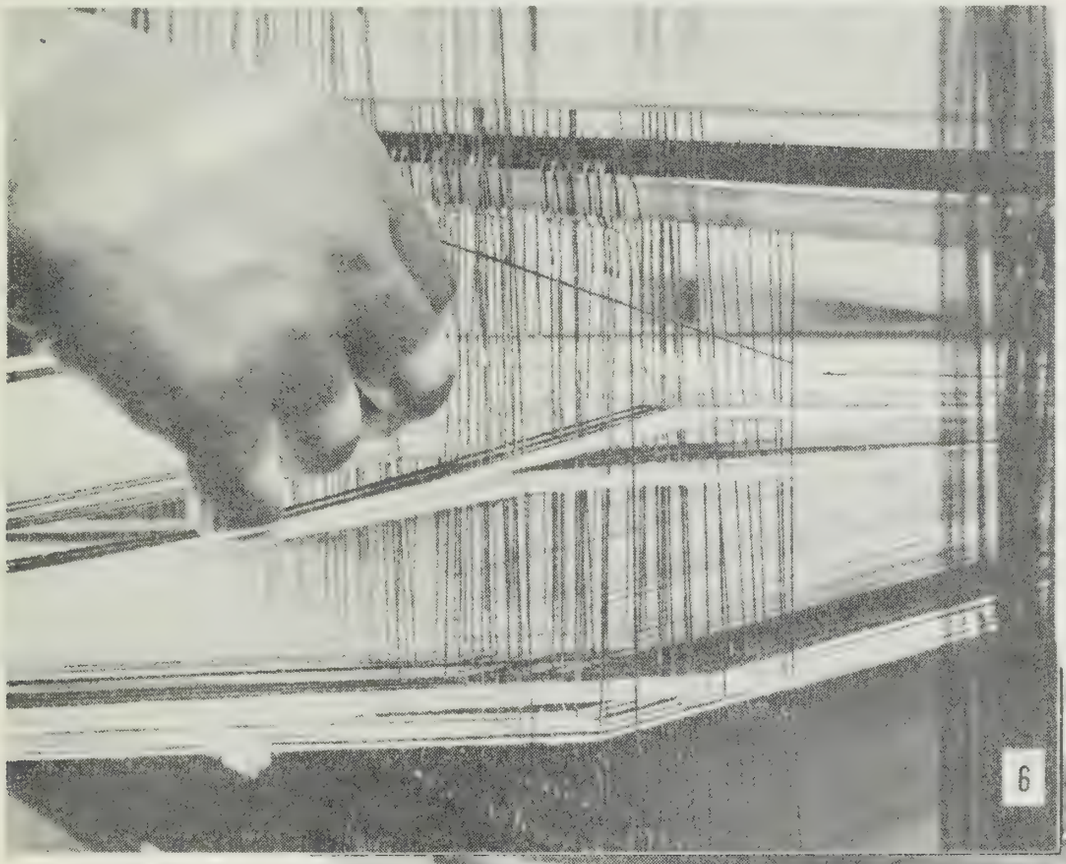
Weaving the colored border can now be started. When the desired number of threads has been woven in, the colored thread is ended in the same manner as the weft thread.

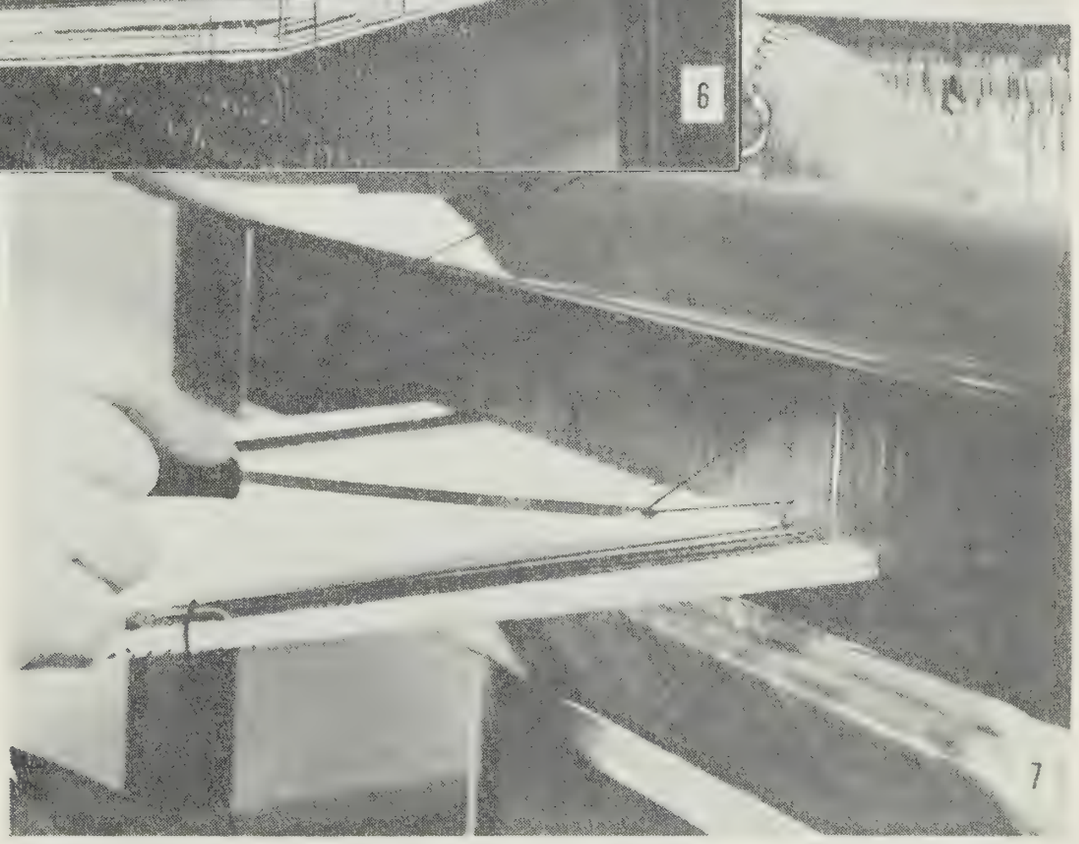
Plan borders with an uneven number of colored threads, i.e. 3, 5, 7, etc. The finished effect is more interesting and the various colored threads will not then begin and end on the same side of the web, thereby building up one selvage more than the other.

Broken warp threads are usually the result of carelessness; either in leaving slack threads when tying on the warp or in entering the shuttle into the shed; or again the weaver may pull the weft thread too tightly, causing the selvage threads to pull in at an angle to the reed. The action of the beater against these threads will soon cut them. Sometimes the material chosen for warp is loosely and softly spun and does not have sufficient body to stand up under the constant friction caused by the beating.

Though broken warp threads are an annoyance and waste of time; they can be repaired easily and neatly.

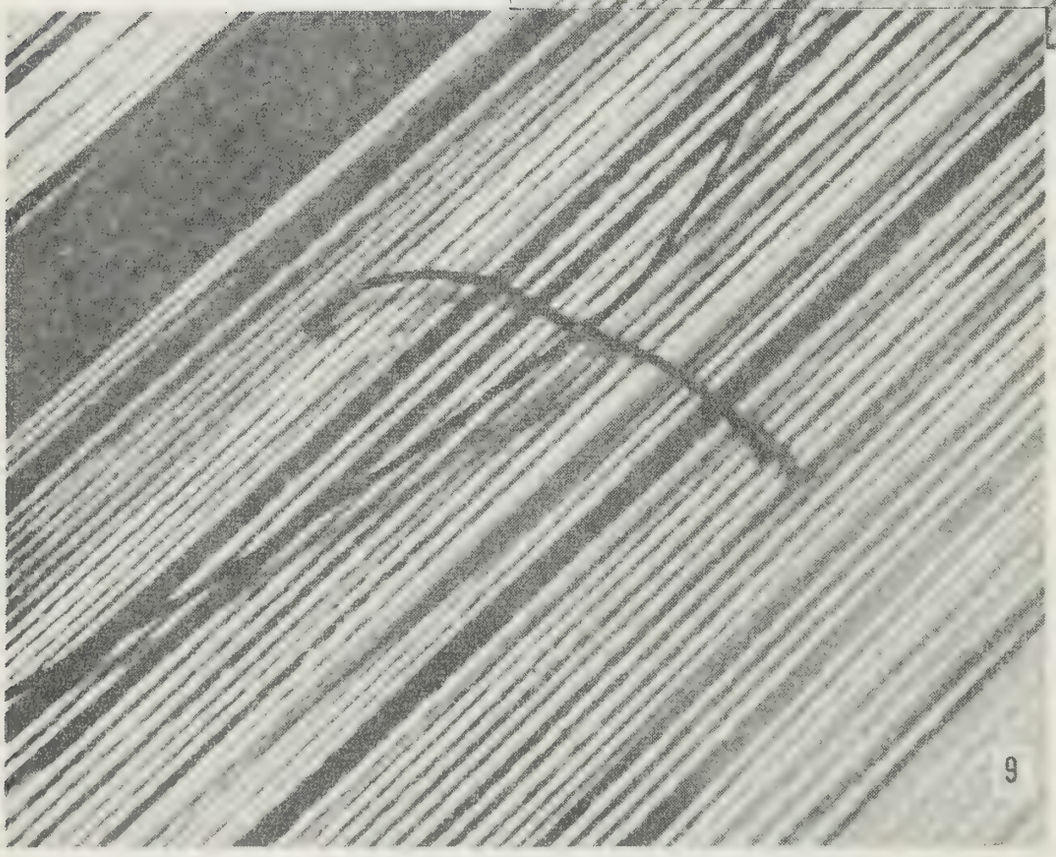
To repair a broken warp thread take a new piece of warp thread about two yards long and draw the end through the empty heddle.





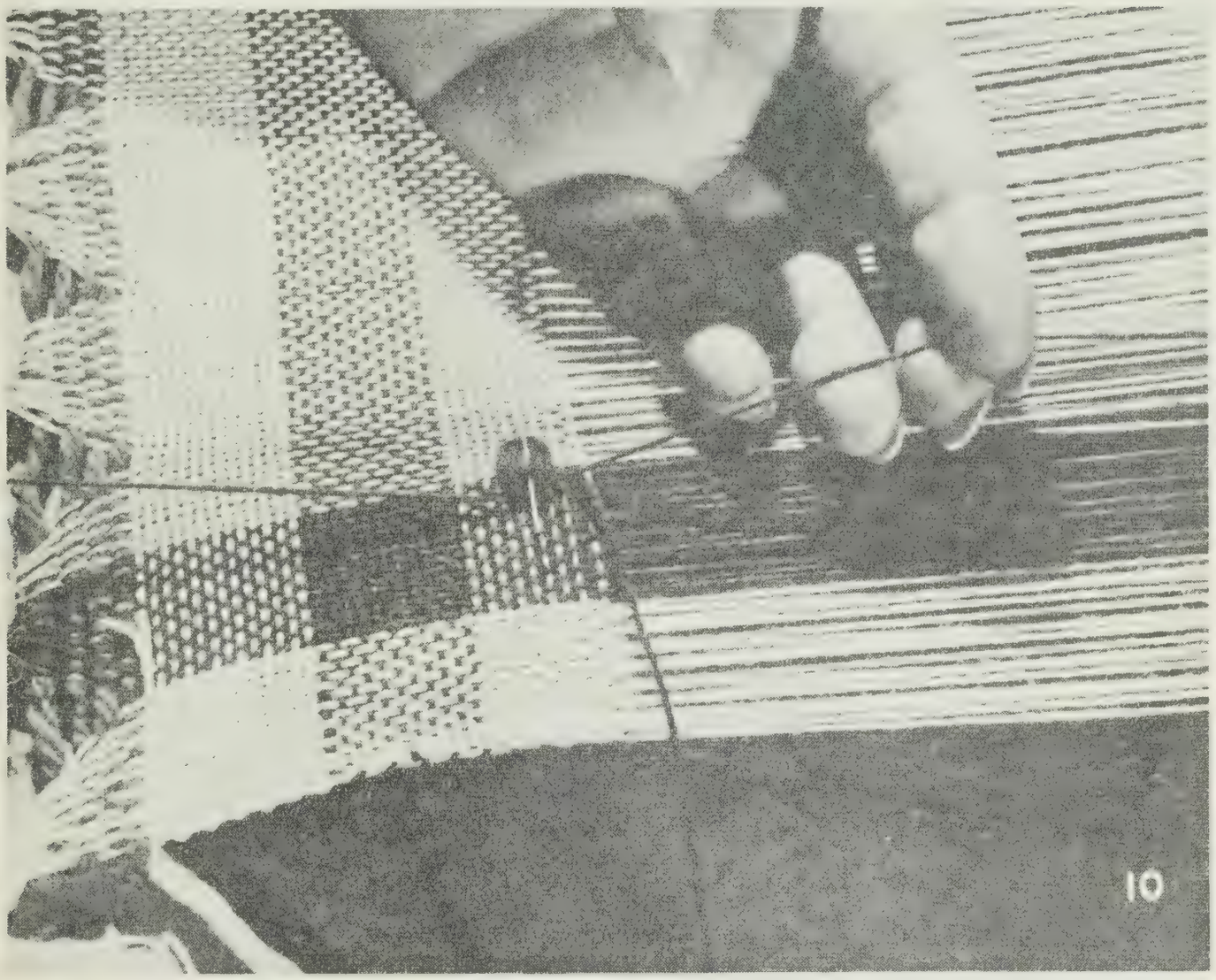
Now draw the end through the empty dent in the reed.

With a weaver's knot tie the end of the new thread to the end of the broken warp thread where it lies at the edge of the web.

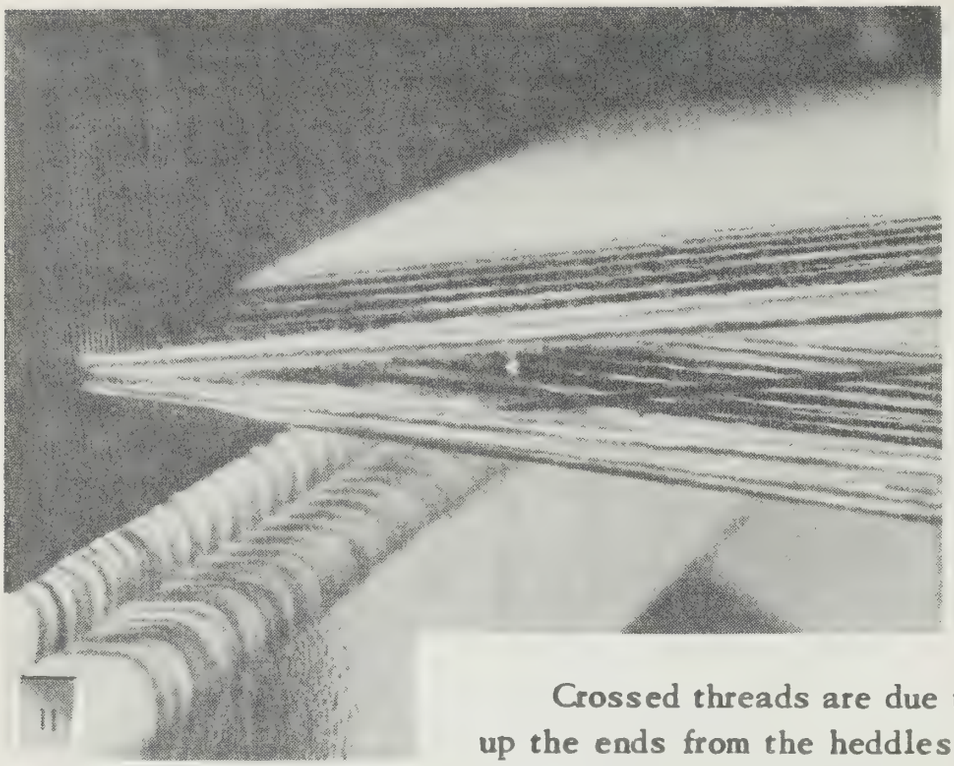


The knot is now drawn tight.

Draw the new thread back about two inches onto the web and wind it around a pin stuck into and at right angles to the web.

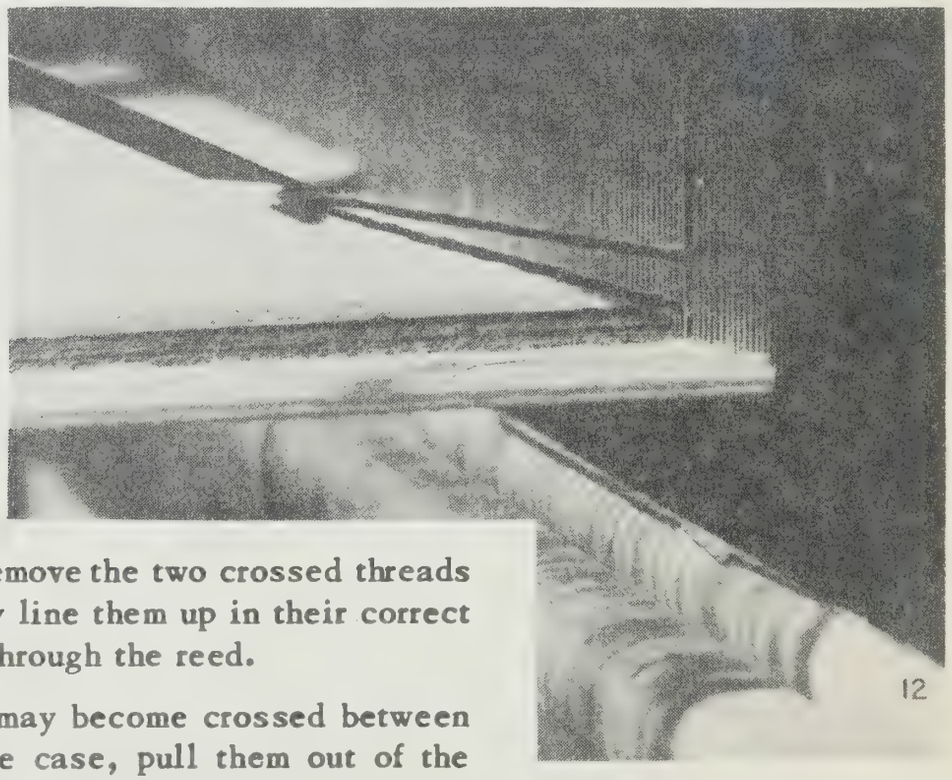


Now go to the back of the loom and hang a weight (a ½ lb. tube of warp does very well) on the end of the new thread. This will hold it at a tension as the weaving proceeds. When the piece of material has been woven the desired length and the weaver is ready to weave a second piece, the end of the broken warp thread lying at the back of the loom is tied on the end of the repair thread attached to the weight (after removing the weight, of course). Now draw the repair thread and the old thread carefully through the heddle and the reed to the edge of the web. Remove the repair thread and fasten the end of the original warp thread around a pin at the same tension as the other threads. There will be no signs of the repair if the ends of the weaver's knot are untied and carefully darned in.



11

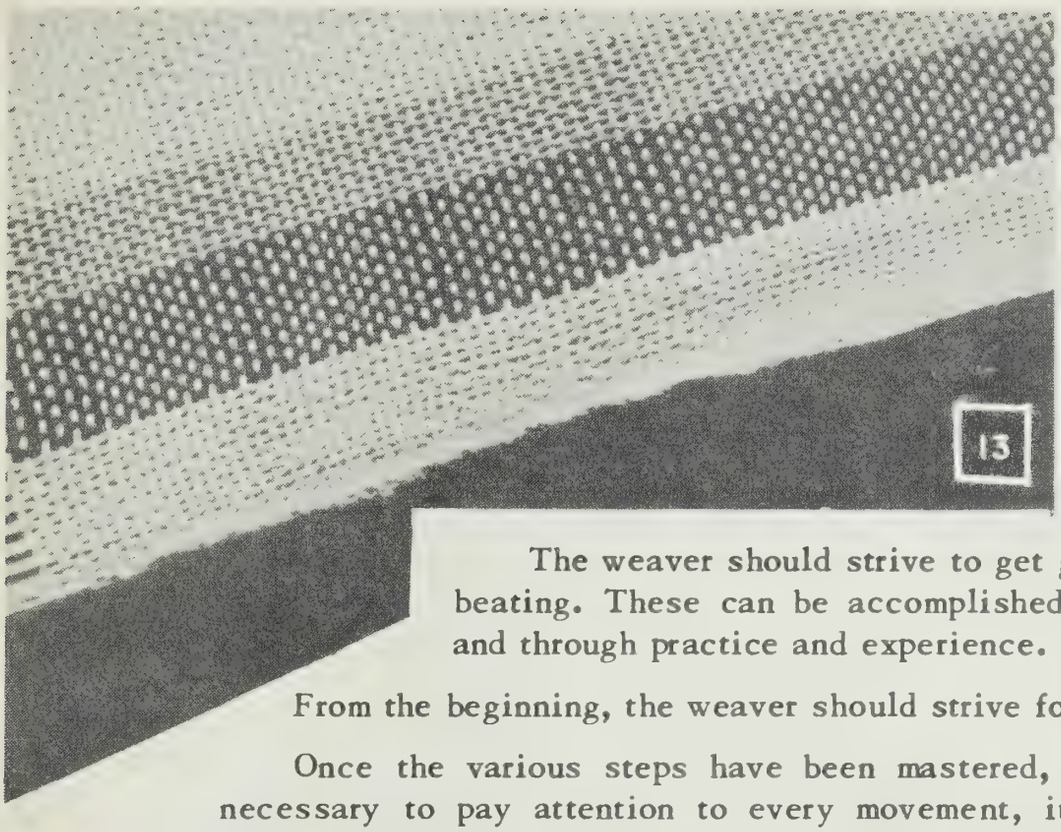
Crossed threads are due to carelessness in picking up the ends from the heddles in the correct order when sleying the reed.



12

To remedy this error remove the two crossed threads from the reed and carefully line them up in their correct order. Now rethread them through the reed.

At times the threads may become crossed between the heddles. If this is the case, pull them out of the reed, and, referring to the pattern draft if necessary, line them up in their correct order and rethread through the reed.



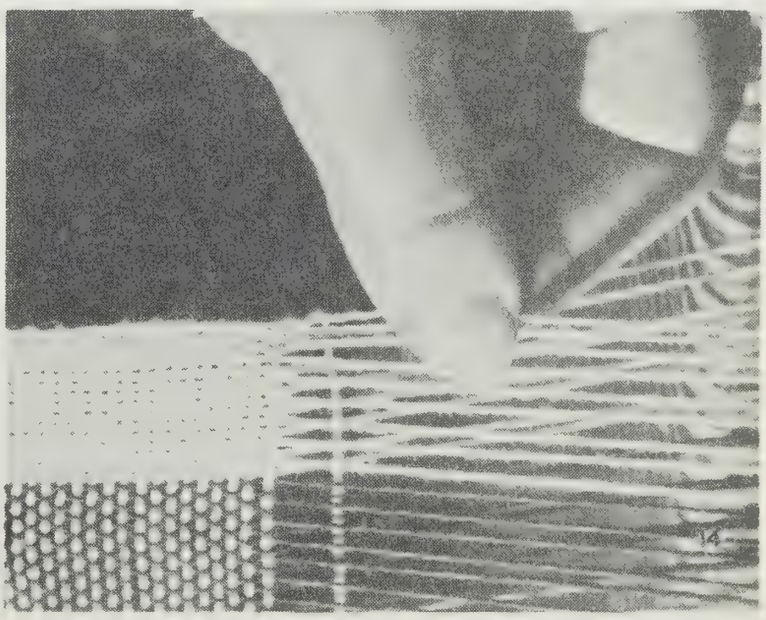
The weaver should strive to get good edges and even beating. These can be accomplished with care to detail and through practice and experience.

From the beginning, the weaver should strive for rhythm.

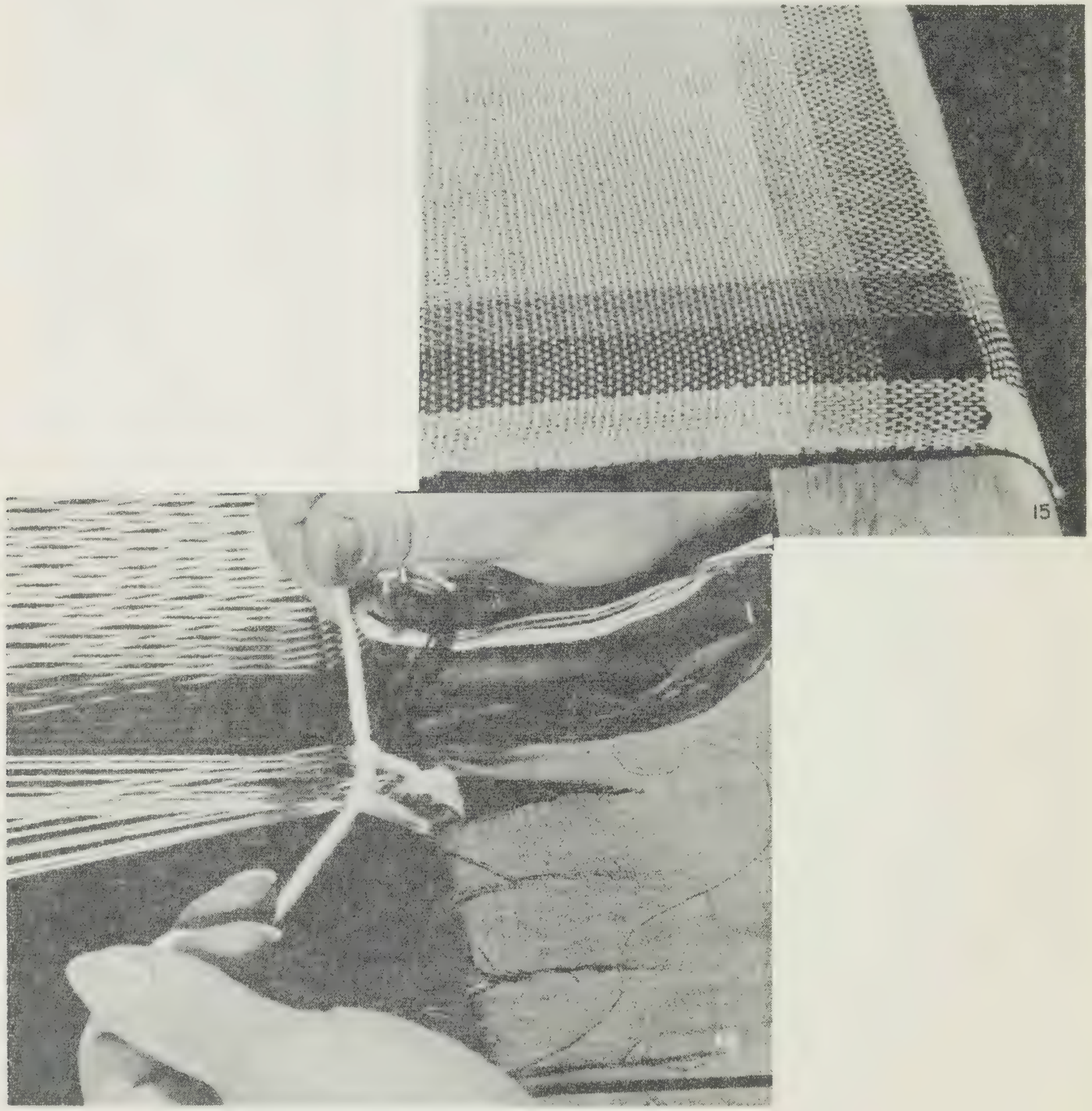
Once the various steps have been mastered, and it is no longer necessary to pay attention to every movement, it is a good idea to think or hum a tune to oneself that synchronizes with the changing of the treadles, the tossing of the shuttle and the beating.

The tempo should be slow but regular at first, then stepped up as the movements become more rhythmical and unconscious.

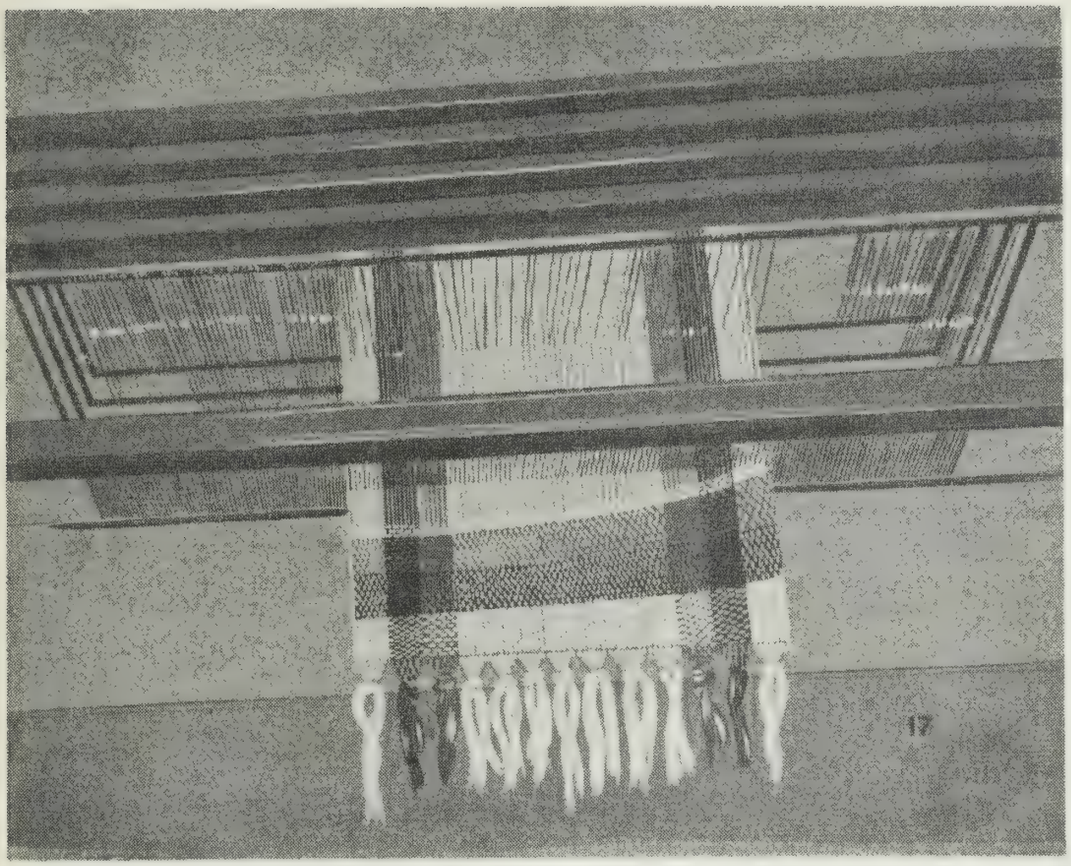
If the weaver experiences trouble with the selvages and a little ridge follows up the web just inside the edge thread, it can be corrected by gently pulling the weft thread between the thumb and finger in the direction in which the weft is travelling. Hold the thread in position until the shed is changed and the weft beaten back into position.



Note the loose threads at the selvages and at the centre of the web. These are the result of carelessness when tying the warp ends on the cloth beam rod. The tension of these threads is much slacker than the tension of the other warp threads and must be corrected.

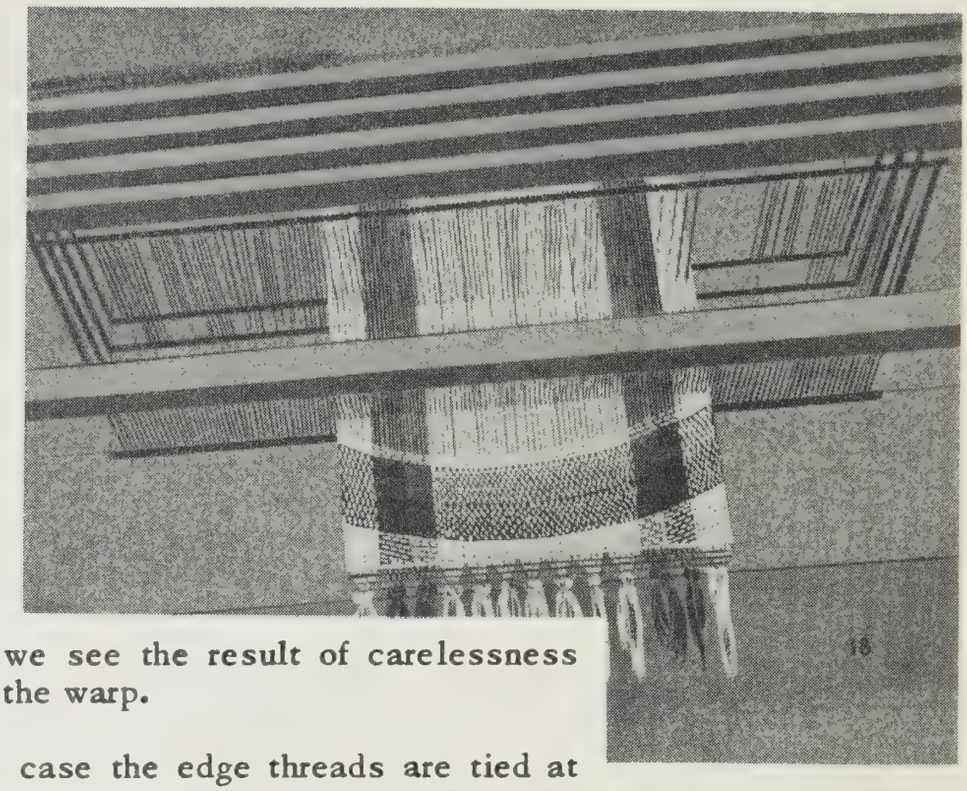


To correct this error untie from the cloth beam rod the group of warp ends in which these loose threads appear, then tighten and retie at the proper tension.



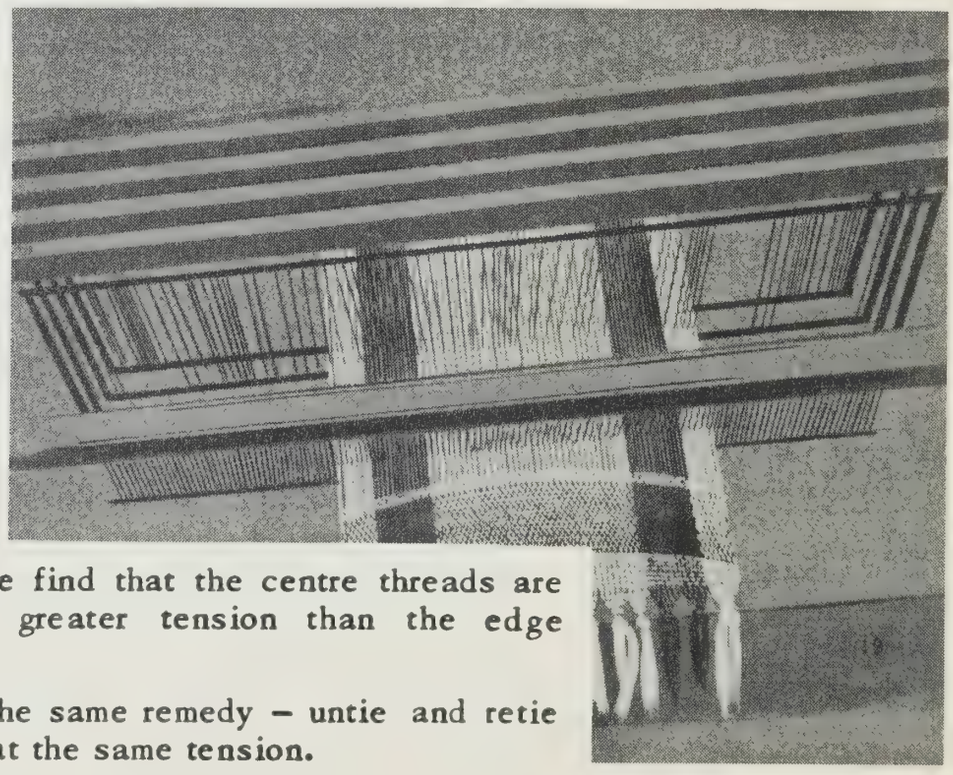
The beater should be grasped either by one hand exactly in the centre, or else by both hands, placed equidistant from the centre. If this is not done, the beater is apt to be pulled to one side at an angle, with the result that the side of the web where the greatest pressure is brought to bear does not build up as rapidly as the other side.

This error may be due also to carelessness in weaving in the rags or heavy threads at the beginning. If there is any difficulty in getting a straight line across the web just after the weaving has been started, run in a flat stick, change the shed, and push it back gently with the beater, being sure that it touches the reed at all points and lies in the shed exactly at right angles to the warp threads. Start the weaving against this stick which can be removed after several inches of weaving have been done, or left and rolled in with the finished web as it lies around the cloth beam.



Again we see the result of carelessness in tying on the warp.

In this case the edge threads are tied at a greater tension than the centre threads. This prevents the beater striking all the threads simultaneously. The only way to correct this is to retie the edge groups of threads at the same tension as the middle groups.

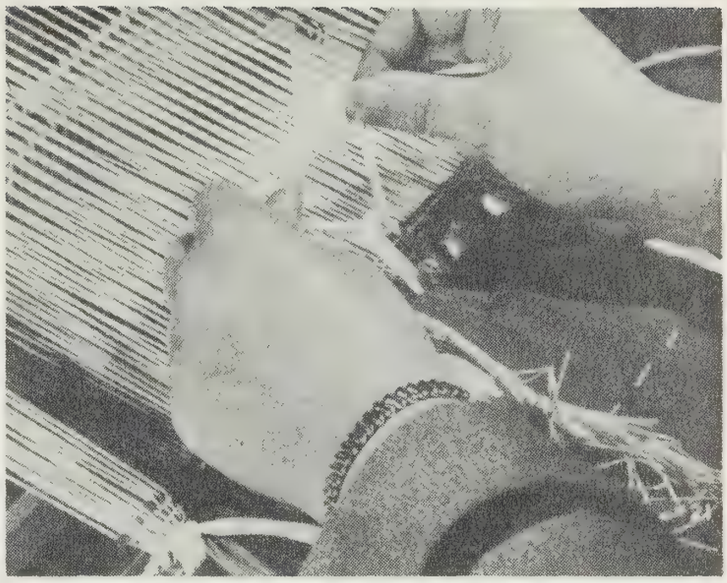


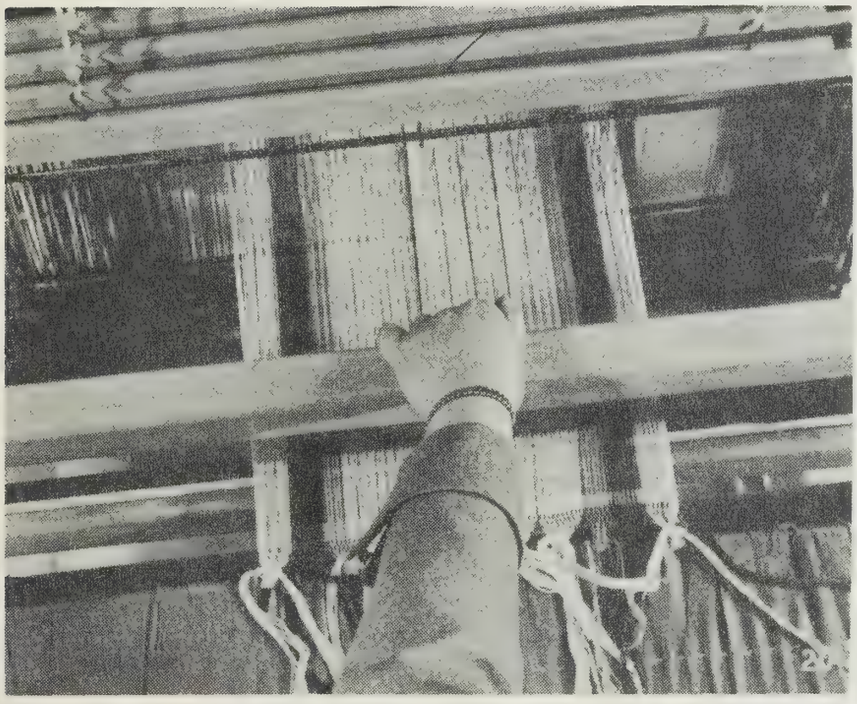
Here we find that the centre threads are tied at a greater tension than the edge threads.

Again the same remedy – untie and retie all threads at the same tension.

The mistake is being corrected.

Remember that it pays to tie all threads carefully, otherwise it is not possible to do good weaving.





This frame shows the correct position of the hand on the beater.

As the weaver gains experience only one hand will be needed on the beater.

These frames have shown you some of the more common errors and how to correct them. You will make others, but you will soon learn how to locate the difficulty and make the corrections. There are many helpful books about weaving which will assist you, particularly if you must weave alone.

WINDING THE BOBBIN

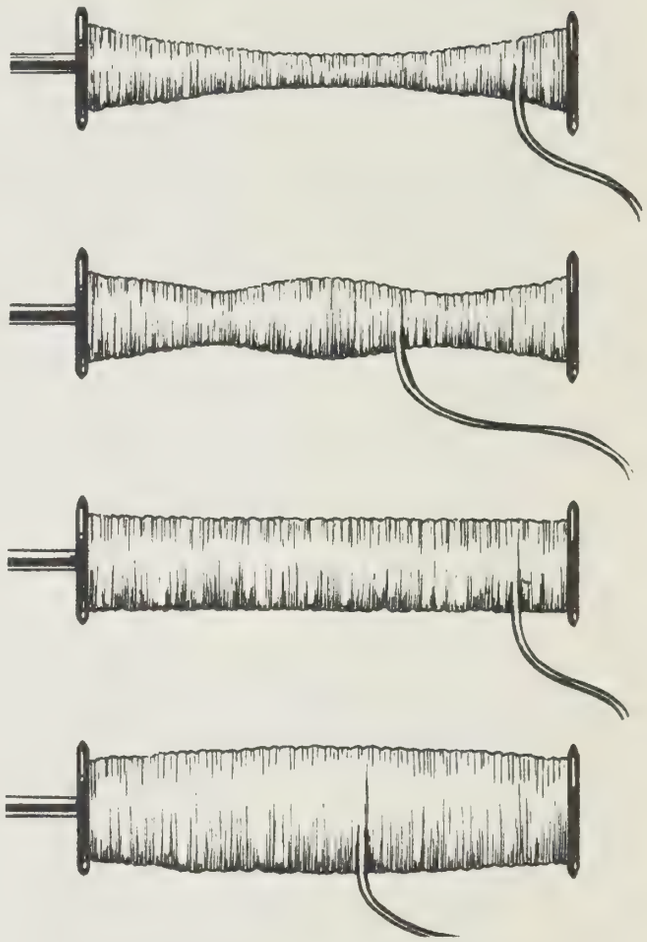
The spool-like bobbin lies within the shuttle and is removed by grasping it in the middle and pulling up on it. In some shuttles the rod that passes through the bobbin is hinged to the shuttle at one end and will stay up at right angles to it until snapped back into position. Other shuttles have a small spring at one end of the bobbin bar. When the bar is pushed back against this, it comes out of a slot at the other end and is easily removed.

Push the bobbin onto the winder shaft until it is tight. If the shaft is tapered, put the end of bobbin having the larger hole on first.

Do not attempt to wind a bobbin by hand. A winder especially made for the purpose can be purchased at a reasonable rate. Ingenious weavers have reported that they have fastened a small spindle or shaft to the sewing machine, to the electric beater, the milk separator and even to a stationary bicycle with the young owner furnishing the power. Any method which turns a spindle is acceptable.

No matter what the method, start by tieing the end of the thread as tightly as possible around the bobbin, or make a few turns of the thread around the bobbin with the fingers. The latter is the better method but requires a bit of practice.

Start turning the winder and fill up each end of the bobbin close to the inside



of the wheel ends (1) then run back and forth across the centre and up on the two ends previously filled (2).

Now fill in the centre of the bobbin until the thread lies in a straight line from end to end (3). Strive to wind a smooth bobbin. Keep in mind the smoothness of a spool of thread.

The last few turns will fill up the middle making it higher than the ends (4). Care must be taken not to make it higher than the ends of the bobbin or the shuttle may not pass smoothly through the shed nor turn easily in the shuttle.

When the bobbin is full, remove it from the winder shaft, slip it onto the shuttle bar in such a manner that when the bar is snapped back into place, the thread will come from underneath. The end of the thread is now passed through the hole in the side of the shuttle. Pull out a length of thread the width of the warp and the shuttle is ready for use.

Weaving books of value to the beginning weaver

Beriau, O. A., "Home Weaving" (Gardenvale, Que.)

Excellent illustrations. Has working drawings for a four-harness floor loom.

Black, Mary E., "Key to Weaving" (Milwaukee, Wisc., Bruce Publishing Co.)

Designed especially for the beginner, it answers the many questions that arise while learning to weave.

Brown, Hariette J., "Handweaving for Pleasure and Profit" (New York 16, N. Y. Harper and Bros.)

A clearly written book, but covers only two-harness techniques. Has good photos and drawings.

Davison, Marguerite P. "A Handweaver's Pattern Book" Revised edition (Swarthmore Penn. Box 299, M. P. Davison)

A book devoted entirely to tabby, twill, and other weaves. Supplements other books which stress techniques rather than patterns.

Loom Music Monthly publication. Tells you what to weave and how to use your threads to the best advantage (Edmonton, Mrs. Mary Sandin, University of Alberta.)

Materials For sources of equipment and weaving materials, it is suggested that you contact the Handcrafts Division of your provincial government.

Glossary of weaving terms

Apron — piece of canvas attached to the warp and cloth beams through which a rod is passed. The warp ends are tied to this rod.

Apron Rod — a rod which is passed through the apron, on which the warp ends are tied.

Back Beam — see Beam.

Beam

— **back beam** — beam at the back of the loom over which the warp passes to the warp beam.

— **breast beam** — beam at the front of the loom, between the beater and the cloth beam over which the web passes to the cloth beam.

— **cloth beam** — the beam at the front of the loom around which the finished cloth or the web is wound.

— **cross beams** — the cross beams rest on two posts and form part of the basic framework of the loom.

— **front beam** — see Breast Beam.

— **warp beam** — the beam at the back of the loom around which the warp is wound.

Beater — the frame holding the reed. Used to "Beat" the weft thread back into place in the web.

Bight — a group of warp ends.

Bobbin — a reel or spool that carries the weft thread. It is inserted in the shuttle.

Bobbin Winder, hand — a device to wind bobbins which carry weft threads.

Bobbin Winder, Motor — a device to wind bobbins which carry weft threads.

Brake or Dog — see Dog.

Brake Treadle — a treadle that releases the brake or dog.

Breast Beam — see Beam.

Chain — the warp as taken from the warping board or reel is chained to shorten and prevent tangling.

Cloth — see Web.

Cloth Beam — see Beam.

Cloth Beam Apron — the apron at the front of the loom that turns around the cloth beam.

Cloth Beam Rod — the rod that runs through the cloth beam apron and to which the warp ends are tied.

Cross — the crossing of threads at the start of the warp during winding to form a leash. Old weavers referred to this as the porrey cross.

Cross Beam — see Beam.

Dent — a single space in the reed.

Dog or Brake — a small catch fastened to the side of the loom to act as a brake for the ratchet wheel.

Draft — a drawing on ruled paper of the pattern or design to be used in threading the loom.

Ends — (Warp) — ends of the warp, after cutting in the chain.

Front Beam — see Beam.

Hand Winder — see winder.

Harness — the frames on which the heddles are hung.

Heddles — wire, twine, or flat pieces of steel with holes or eyes in the center through which the warp ends are threaded.

Heddle Eye — a loop or opening in the center of the heddle.

Hook (Warp-hook) — a flat metal hook used to pull the warp ends through the reed.

Knot (Snitch-knot) — a knot used to tie the lamms to the treadles.

Knot (Weaver's knot) — a knot commonly used by weavers for many purposes around the loom.

Lamms — horizontal levers tied between the harnesses and the treadles.

Lease or Leash — crossing of the warp threads during winding between the warping posts to keep them in order during threading.

Leash or Shed Sticks — two thin sticks used in the cross or shed to keep the threads in order.

Loom — an upright frame or machine of wood or other media on which a weaver works thread into a web.

Motor Winder — see Winder.

Pattern — see Draft.

Pick or Shot — a single shot of weft thread passed through the shed.

Rack — Spool — a frame with rods to hold the spools when winding the warp.

Ratchet Wheel — a wheel with teeth, fastened to ends of beams to hold warp at the proper tension.

Reed — a comb-like piece set in the beater to separate the warp threads and used to beat the threads together to form the web.

Roller — refers to the warp or cloth beam, also to a cross piece from which the harnesses are hung.

Ratchet Wheel — wheel with teeth fastened to the ends of the beams to hold the warp at the proper tension.

Selvage or Selvedge — the edge of the web.

Shed — a V-shaped opening formed in the warp, by raising or depressing the treadles, through which the shuttle is passed.

Shed Stick — see Leash Stick.

Shot — the passage of the shuttle through the shed.

Shuttle — an instrument for carrying the weft thread.

Sley — (verb) to draw the threads through the dents in the reed with the warp hook.

Snitch Knot — see Knot.

Tabby — a plain weave, over one under one thread.

Tension — stretching and tying warp threads so they will all be the same length.

Treadles — pedals used to depress the harness on the foot loom. See also Brake Treadle.

Warp — a system of threads running lengthwise in the loom across which the weft threads are passed to form a web or cloth.

Warp Beam — see Beam.

Warp Beam Apron — an apron at the back of the loom around which the warp is wound.

Warp Beam Rod — a rod that runs through the warp beam apron to which the warp ends are tied.

Warp Chain — see Chain.

Warping Board or Reel — a heavy wooden frame or reel with pegs spaced at intervals around which the warp is wound.

Warp Hook — see Hook.

Weaver's Knot — see Knot.

Web — a piece of woven cloth.

Weft Threads — these are woven across the warp threads to form cloth.

Wheel, Ratchet — see Ratchet Wheel.

Winder — the winder is used to wind the thread on the bobbin. Hand winders are adequate for average usage. Motorized winders reduce production time when large quantities are required.

INFORMATION MATERIALS MAY BE OBTAINED FROM THE

Physical Fitness Division
Department of National Health and Welfare
Ottawa, Canada
and

ALBERTA

Health and Recreation Branch,
Department of Education,
Edmonton.

BRITISH COLUMBIA

Community Programmes Branch,
Department of Education,
Victoria.

MANITOBA

Fitness and Recreation Division,
Department of Health and Public Welfare,
320 Sherbrook St., Winnipeg.

NEW BRUNSWICK

Physical Education and Recreation Branch,
Department of Education,
Fredericton.

NEWFOUNDLAND

Department of Education, St. John's.

NORTHWEST TERRITORIES

Northern Administration,
Department of Resources and Development,
Ottawa.

NOVA SCOTIA

Physical Fitness Division,
Department of Education,
3rd Floor, Provincial Bldg., Halifax.

ONTARIO

Community Programmes Branch,
Department of Education,
206 Huron St., Toronto.

PRINCE EDWARD ISLAND

Physical Fitness Division,
Department of Education,
Charlottetown.

SASKATCHEWAN

Fitness and Recreation Division,
Department of Education,
1100 Broad Street, Regina.

PHYSICAL FITNESS DIVISION

Department of National Health and Welfare

Ottawa Canada